MOTORSHIP

In the Interests of Commercial Motor Vessels

Vol. 1 SEATTLE NOVEMBER, 1916 NEW YORK No. 7

AUX. MOTOR SCHOONER "JUNE"

Owned by M. T. Snyder, of New Orleans, La. Recently Built by St. Helens Shipbuilding Co., St. Helens, Ore. View Shows Her Departure from Portland, Ore., with Cargo of Lumber for Balboa.

Published on the Twenty-fifth of the Month

MOTORSHIP

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Latest Addition to World's Fleet of Motorships

The M. S. "Peru," a Twin Screw Vessel of 9,500 Tons D. W. C. and 3,100 I. H. P.

Possibly the trials of the twentieth large motorship built to date by Burmeister & Wain of Copenhagen, Denmark, will arouse into active interest those American shipowners and shipbuilders who still regard the motorship movement without respect or serious interest. Let it here be stated that these Danish builders have definite orders for motorships—and motorships only—to occupy fully their shipyards for six (6) years, a position in which no steamship building yard in the world is in today.

Further, let it be impressed upon the mind that these motorships have not been ordered by newcomers to the motorshipping business, but by concerns who have many such vessels in active service, and therefore are perfectly familiar with the faults as well as the advantages of the marine Diesel-type internal combustion engine as propulsive power for large mercantile craft.

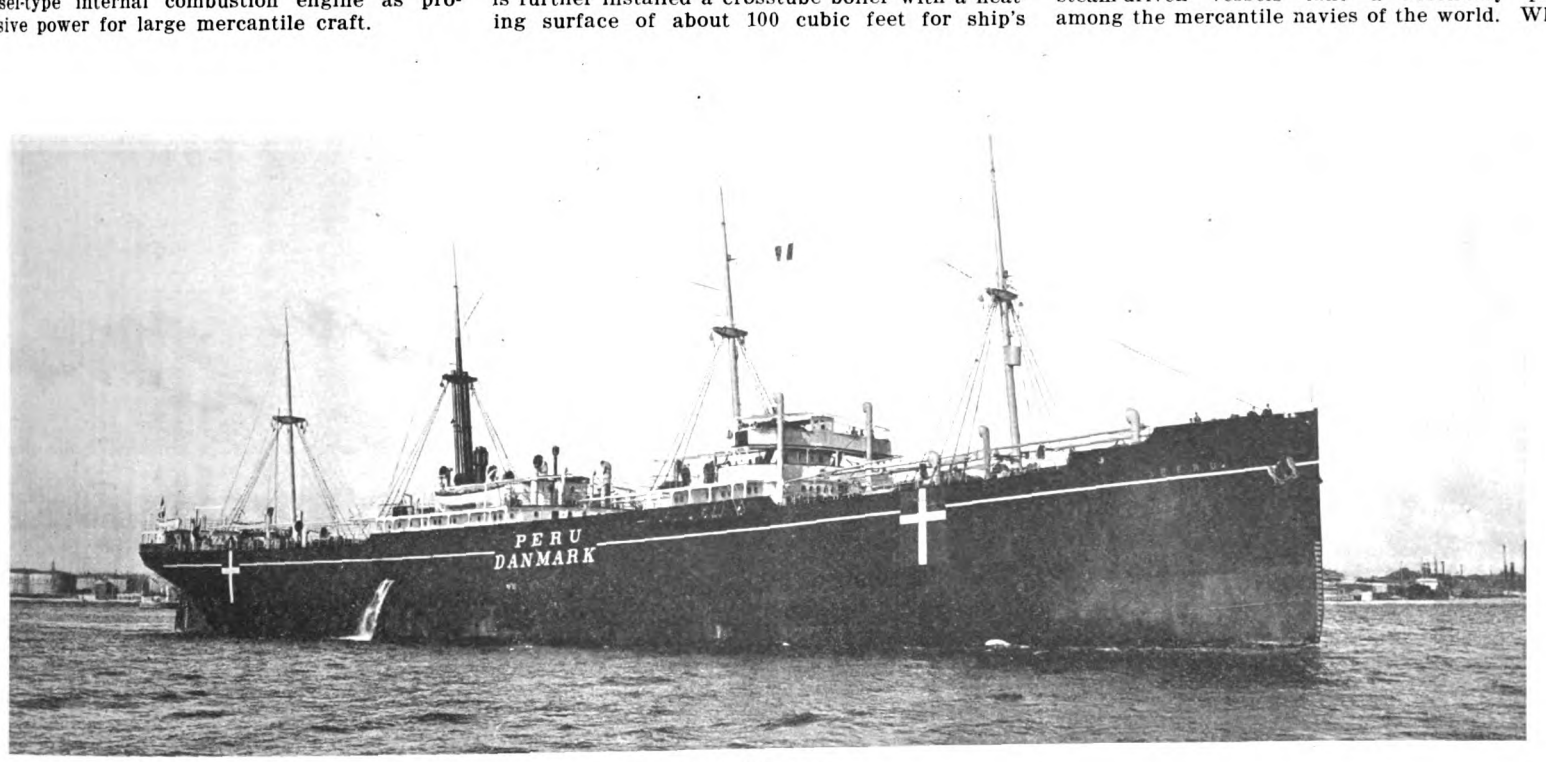
Messrs. Burmeister & Wain, encouraged by the reasonable success they have had with motorships during the last five years, have absolutely abandoned the construction of steamers in any shape or form. Yet by reason of the amount of work on hand (about forty ships of 8,000 to 12,000 tons displacement), in comparison with the capacity, Messrs. Burmeister & Wain have without exception the busiest shipyard in the world today. Any one who saw the Burmeister & Wain yard before they commenced Diesel ship construction will appreciate what this new development has meant to that one concern. Evidently the William Cramp & Sons Shipyard of Philadelphia are alive to the possibilities, for they have enterprisingly secured the exclusive U. S. A. license for the Burmeister & Wain marine Diesel-type engine, preferring to build a proven motor, rather than developing their own design.

Burmeister & Wain's latest ship, the "Peru," ran her trial trip on Copenhagen Sound on August 22 last, and the same day was taken over by her owners (the East Asiatic company, who, by the way, have sold all their steamers and are replacing them as rapidly as possible with Diesel-driven motorships). The "Peru" is the sister ship to the M. S. "Columbia" and the M. S. "Chile," and has the following dimensions:

Length between perpendiculars, 425′ 0″; beam, 55′ 0″; depth, 30′ 6″; draught, 26′ 5″; d. w. capacity, 9,500 tons.

She is fitted with two reversible six-cylinder four-cycle Diesel-type main engines, developing in total 3,100 i. h. p. at 125 revolutions per minute and giving the ship a speed of 11.15 knots. Further, the ship has three auxiliary Diesel engines, each developing 90 b. h. p. at 300 revolutions per minute from two cylinders directly coupled to dynamos for production of current for working all the engine room auxiliary machinery, the cargo winches, anchor windlasses, steering gear and for electric light. In the engine room is further installed a crosstube boiler with a heating surface of about 100 cubic feet for ship's heating purposes and for production of steam for a steam-driven auxiliary air compressor.

During the trial trip the speed was tested over the measured mile and averaged 12.74 knots at 3,685 i. h. p. and 139.3 revolutions a minute, which speed obviously is remarkably good. During a four hours' consumption test the consumption of fuel oil proved to be 144.8 grammes per i. h. p. per hour, including the fuel oil for auxiliary motors. The fuel oil was Borneo crude oil of a heating value of 18,000 b. t. u. After the trial trip the ship went into the present freeport for taking cargo on board, and on the 24th ult. she started her maiden voyage round South Africa to Australia. T. O. L.



M. S. "PERU."

"SEBASTIAN" MAKES ROUND TRIP TO EUROPE.

The Diesel-driven motorship "Sebastian" left New York on September 14 with a cargo of 4,110 tons of residual oil and arrived at Havre, France, on September 30. She shortly will return to New York City.

SIR JAMES MILLS AND THE MOTORSHIP

Before the Institute of Marine Engineers, London, Sir James Mills recently made some important statements, to which we draw the attention of American shipowners and shipbuilders, because in more senses than one, part of his remarks form a direct challenge to our domestic motor shipbuilding industry. Sir James stated that:

"Perhaps the most remarkable development of modern times is that of the internal-combustion engine. We have seen, in the submarine, for example, the high utility of this motor. This type of marine engine for commercial purposes has already been fairly well tested in ships of moderate capacity, and we looked to the larger vessels now being built to provide a convincing test. It seems fair to expect within a few years to see steam-driven vessels take a secondary place among the mercantile navies of the world. Whatever revolutionary changes might be made in the future, I am satisfied that in competition for the most efficient and economical forms of machinery, for both naval and mercantile ships, British engineers would lead the way."

Another statement made by Sir James offers much food for reflection, particularly because of his portion of authority in the steamship field. We refer to the following, which was in connection with the future of Great Britian in the shipping world:

"To meet the new situation we shall require not only ships equal, if not superior, to those of our rivals, but we must also be in a position to employ our tonnage to the very best advantage, and with the greatest economy. It is obvious that the continuance of our supremacy as a maritime power will depend in no small degree upon the character and efforts of our engineers, whether they be designers, manufacturers, superintendents or sea-going engineers."

If Great Britain resorts to motorships to compete with Americans for world-wide trade, it is obvious that shipowners in the United States must do likewise, because steamers cannot compete with Diesel ships on long-distance routes.

Interesting Installation in Oil Tanker "Nuuanu"

The oil engine installation, recently completed in the tank vessel "Nuuanu" for the General Petroleum corporation of San Francisco, is in several ways unique and of exceptional interest. Especially interesting to those who contemplate the conversion of old barges or sailing vessels into motorships are the methods in which certain engineering difficulties were surmounted: the installation being made, as it was said along the waterfront, practically "with a shoe-horn," owing to the very limited space that could be used for the engine without extensive remodeling. Another feature worthy of attention is the hull alteration required to provide for the propeller shaft, and the installation of the cast steel stern frame, as shown in the illustrations; and another matter worthy of note is the quick time in which the installation was completed after the receipt of the engine.

The "Nuuanu," formerly the British bark "Highland Glen," was built of iron in 1882 by Ramage & Ferguson, at Leith, Scotland, and for many years was engaged in the sugar trade between the Hawaiian islands and the Atlantic coast, and is of the following dimensions:

Length, 211.3 ft.; beam, 34.0 ft.; depth (moulded), 19.6 ft.; gross tonnage, 988; net tonnage, 786; cargo capacity, 10,000 bbls. (42 gals. per bbl.).

During the latter part of 1913, this vessel, then bark rigged and engaged in the carrying of general cargo, was converted to carry crude oil in bulk.

Top masts and all spars were removed and a fore and aft schooner rig substituted therefor, with booms and other spars fastened to the original iron lower masts.

The pump room, situated forward of bulkhead No. 83, is fitted with a Fairbanks-Morse duplex power pump 8"x12" operated by a 50 horse power Gorham gas engine, with a Morse silent chain drive from engine to pump. This pumping-out equipment has a capacity of 2,000 barrels per hour.

SHOWING STERN FRAME "NUUANU" IN POSITION AND PLATED.

This vessel was fitted for towing at sea, but in the early part of this year it was determined to install self-propelling power, using an internal combustion engine of the hot-bulb type.

On account of the vessel being already tanked, the installation of twin screw engines was practically prohibited. Therefore, it was determined to install a single screw Bolinder engine of 320 b. h. p., this being the largest unit that could be fitted to the space available.

Being one of the earlier types of British sailing vessels, she had exceedingly fine lines aft; and in order to set the engine bed low enough to provide proper submergence for the propeller and to provide for the length of the engine and avoid shifting the oil-compartment bulkhead further forward, a recess 30" in depth was built into the cofferdam space. The engine occupies an exceptionally small space and is really installed in what was formerly the "lazareet" of the vessel.

Heavy flanged tie plates are fitted between the vertical stiffening members on bulkheads at frames 16 and 18, thus

STERN FRAME CASTING "NUUANU."

tying same together and otherwise providing the necessary stiffness as demanded by the Classification Societies' rules.

To further prevent the possibility of gas accumulations reaching the engine room, a gas tight steel bulkhead was fitted at frame No. 17 in the 'tween deck space over the expansion trunk top and at the sides of same. There are no openings of any kind in this bulkhead, thus effectively shutting off the cargo space from the engine room.

The engine seating is of very heavy construction, secured to every frame and thoroughly braced and bracketed to prevent any movement of the main engine.

The main engine exhaust is connected to the vessel's iron mizzen mast with a slip joint connection between the mast and the engine, so that any movement of the engine or mast will not strain the piping.

For the purpose of providing for the installation of the propeller, an opening was cut in the after run of the ship just forward of the rudder post and a cast steel stern frame was fitted to this opening. Accurate measurements were taken from the interior of the vessel and the stern frame was gotten out before the alterations were commenced. It is worthy of note that same went into place without difficulty and in a very satisfactory and pleasing manner. This stern frame is secured by being double riveted through the ship's plating, and in addition has steel doubling plates 5/8" thick through-riveted through the keel and through the stern frame foot, also large doubling plates 5/8" thickness over the top arch securely rivcted to the stern frame and to the ship's plating and stern frame. In addition to this fastening, the doubling plates along the lower portion of the stern frame were welded along their edges to the stern frame, and the connection of the lower portion of the stern frame to the rudder post was also welded, as was the upper connection of the stern frame to the rudder post.

Owing to the propelling engine being set so far aft in this vessel, it was not possible to fit an intermediate shaft; and in order to provide for the drawing of the tail shaft, means have been provided for drawing in the stern tube after which the tail shaft can be elevated and pulled in to one side clear of the main engine.

The navigating operations of this vessel are directed from the original poop deck, a standard type of hand steering gear being fitted, over which a shelter for the helmsman has been erected.

An especially designed indicating device operating by light gear and shafting from the propeller shaft has been fitted for the purpose of indicating to the officer in charge, the direction and speed at which the propeller is working, thus giving the navigating officer in charge absolute knowledge of the conditions existing.

Bunker fuel space has been provided, of approximately 300 barrels capacity, in the fore part of the vessel. A new oil-tight steel bulkhead was constructed and the space forward of same converted to bunker space. The oil in this tank is transferred to the daily-run tanks in the engine room by compressed air-operated pumps. There are two of these pumps situated in the pump room forward, one of which is fitted with a hand lever attachment for emergency use should the compressed air supply be inadequate or fail. These pumps, while fitted with control valves at the pump, also have control valves in the engine room aft, so that the engineer on duty can fill his run tanks without leaving the engine room.

The lubricating oil storage tanks are located in the engine room with filling pipe connections from the main deck. There is also storage for kerosene and alcohol.

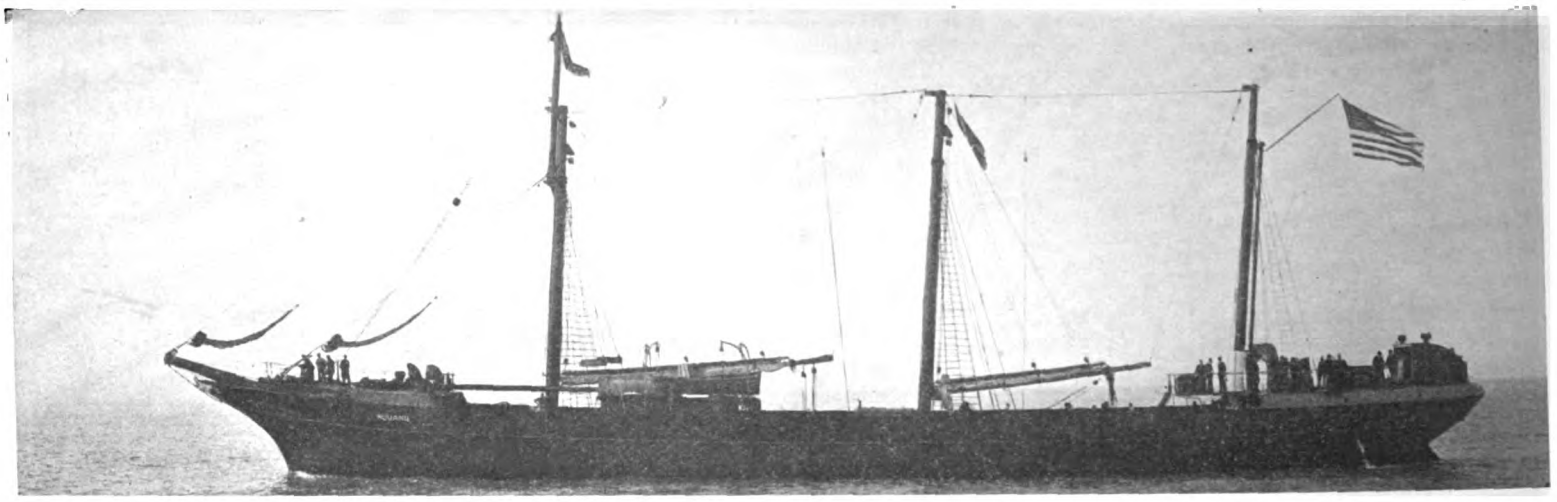
The daily oil supply to the main engine is contained in two run tanks of 350 gallons each, each tank being 36" diameter by 7 feet long set vertically.

The electric lighting for the vessel while at sea is provided by a 3 K. W. belted type generator driven by belt connection from the fly wheel of the main engine. A special pulley was fitted to the dynamo, and by a special belt tightening arrangement this equipment was made to operate very satisfactorily.

For auxiliary service, especially in port, there is installed a 4 K. W. 2-cylinder Carlisle-Finch electric lighting set, which engine also operates by clutch connection and chain drive a Rix 2-stage air-cooled air compressor 3"x1"x1½", which air compressor is provided for charging the starting air bottle and for furnishing compressed air when the main engine is not in operation.

The main engine clutch, which the engine builders furnished with hand lever attachment only, was equipped with a locally constructed air operating device which handled same in a very satisfactory manner. This cylinder is controlled by means of a three-way valve similar to the type of valve used for operating street car brakes, and the air cylinder was so designed and proportioned that the clutch is not thrown in quickly but steadily and slowly and by means of an adjusting arrangement, when the clutch is fully in, the pressure on the thrust collar of the clutch is automatically released.

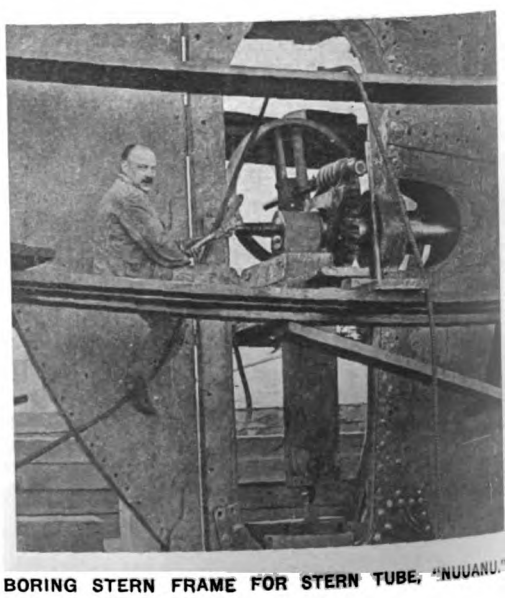
What is reported to be the fastest known time in installing an engine of this type and size was made on this installation. This engine was received by rail, in a box car, completely knocked down and securely packed in very heavy packing cases with all bright parts and working parts of the engine heavily coated with a protective compound which required considerable time to remove. On account of the engine being overdue, every preparation had been made to install the engine promptly, and a picked force of mechanics were selected to undertake the work in the shortest possible time. On the fifteenth day after the engine was received, the erection of same was fully completed and the engine operated for a number of hours. The trial trip was run on the 20th day and the installation being thoroughly complete and no further adjustments being required, the vessel proceeded to her loading berth the day following the trial trip.



MOTOR OIL TANKER "NUUANU" ON TRIAL TRIP.

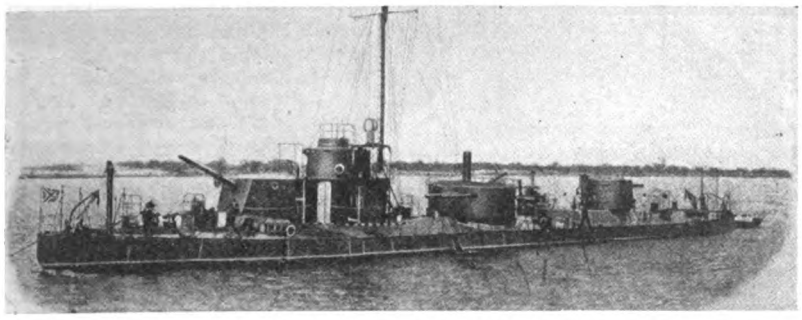
It is worthy of note that this engine operated from the start very smoothly, no bearing troubles of any kind were encountered and no further adjustments were required after the engine was first started up. On the trial trip an engine speed of about 235 revolutions per minute was attained, which gave the vessel, which was fully loaded and drawing 18 feet, a speed of approximately 7 knots per hour, the results being fully up to the owners' expectations.

The installation was made by Muir & Symon, Inc., of San Francisco, who designed the installation.

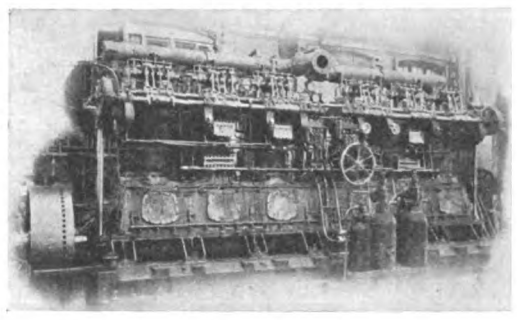


BORING STERN FRAME FOR STERN TUBE, "NUUANU."

Veteran Diesel-Driven Motor Warships



A 1000 b. h. p. Shallow Draft Motor Gunboat Belonging to the Russian Imperial Navy—One of Four in Service on the Amur River, Siberia. Driven by Four 250 h. p. Nobel-Diesel Engines, Through Electrical Transmission, Being a Quadruple Screw Vessel. Length 233 ft.; Beam 43 ft. Armament two 6-in. and four 12 pdr. Q. F. S.

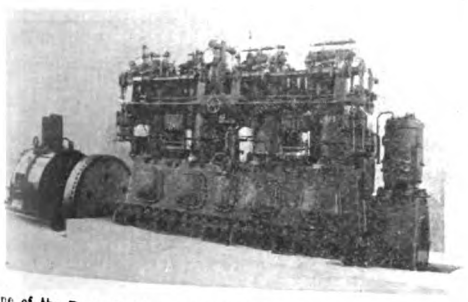


One of the Six-cylinder 500 b. h. p. Reversible Diesel Type Oil Engines Constructed by the Machenen-Fabrik Ludwig Nobel for the Russian Government.

That "semi-Diesel" driven barges and monitors were extensively used by the Allies during the Dardenelles campaign is fairly well known; but it is not so generally known that the British government have been buying very large quantities of Diesel and "semi-Diesel" type engines for all sorts of purposes during the last eighteen months, and now there are large numbers of motor monitors operating in the North Sea, and along the shores of the east coast of England. The story of the five hundred 75-85 ft. high-speed gasoline patrol boats built in, and shipped from, this country is now quite common; but these, and the submarines of all warring nations, motor-tractors, motor ambulances, motor artillery, aeroplanes, caterpillars, and "tanks" bring home forcibly the wonderful part played by the internal combustion engine in the great European conflict.

England, Austria, the United States, Holland, Portugal, Germany and Italy all have some medium-sized motor-driven "surface" naval craft, most of which have Diesel-type engines installed, but it has been left to Russia to build a fleet of fairly high-powered motor-gunboats. Back in 1909 the Standard Motor Construction company of Jersey City, N. J., and Lewis Nixon, supplied Russia with ten 600 h. p. gasoline-driven patrol vessels, but on behalf of the Imperial Russian government the firm of Ludwig Nobel, of St. Petersburg, went a step further and built eight 950-ton shallow-draught Diesel-driven river gunboats, each of 1250 i. h. p; two 875-ton sea-going gunboats, each of 1250 i. h. p; one revenue cruiser of 3508 tons, and converted the old cruiser "Ruenda" to Diesel power, by installing a 1200 b. h. p. Diesel motor equipment.

Regarding the twin-screw Caspian sea gunboats, which at that time were the only large Diesel warships in service, apart from submarines, there are two, and they are of the "Giliak," "Kovietz," "Sivoutch," and "Bobr" class, the latter being four steam-driven gunboats of 875 tons displacement, 12 knots speed, and a complement of 170 offcers and men. Bunker capacity 60 tons. Engines, triple expansion 800 i. h. p. The two motor vessels are "Ardagan" and "Kars," and although of the same class, are slightly less in displacement, due probably to the saving in machinery weights. But they are of higher horsepower, the latter aggregating 1,000 b. h. p. per ship; consequently, they have the increased speed of 14 knots under normal conditions. Doubtless 16 knots could be obtained for a short period if required. Their overall length is about the same as the Amur river craft, with a lesser beam, and greater draught, and their armament consists of one 4.7 gun, and five 12-pounder q. f. s. The first of these two was delivered to the Russian admiralty in 1910, and it was not long before the sister vessel was placed in service.

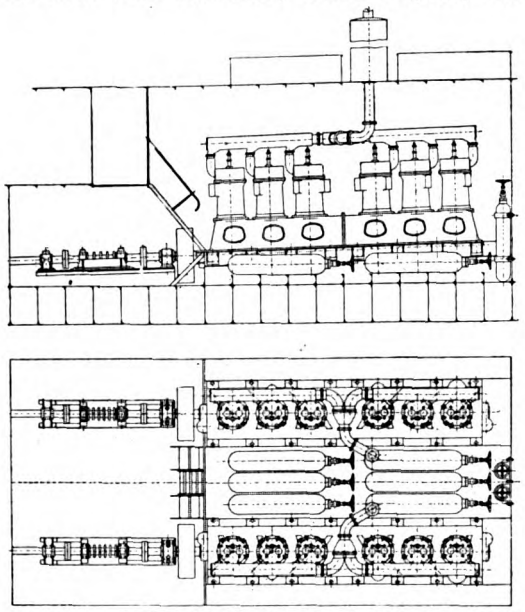


One of the Four 250 h. p. Nobel-Diesel Non-reversible Engines of the Amur River Gunboats, Showing the Del Prosto Electrical Transmission Element.

Naturally the principal interest of "Ardagan" and "Kars" is in their engine-room, the installation and arrangement of the one applying to the other. The propelling machinery consists of two six-cylinder Nobel Diesel-type oil engines, each developing 500 b. h. p. at 310 revs. per minute on the four-cycle principle. Although these engines are reversible, the propellers are driven through Domen-Lablanc pneumatic clutches. Each engine is about 20 ft. long overall, by nearly 7 ft. high from the center of the crankshaft to the center of the fulcrums of the valve-rockers.

From a marine engineer's point of view the design of this particular model has many commendable features, some of which can more than hold their own with many Diesel engines, constructed in 1912. Chief of these is the arrangement of building each engine practically in two halves in order that the forward half may be disconnected from the other in case of accident to any of its cylinders. To allow of this, the camshaft is in two sections with a vertical rod drive at either end of the engine off the crankshaft. Another feature is the system of driving the air-compressors at the back of the engine by beam levers, off the connecting rods, thus dispensing with separate compressing auxiliary plant, but as there are no crossheads the system is a bold one. The only auxiliaries aboard "Ardagan" and "Kars" are two 65 h. p. electric-lighting sets. Another feature is the short push-rods actuating the valve rods, which are worthy of special notice, as the expansion and contraction with the temperature of long rods may be liable to vary the opening of the fuel injection valves, the adjustment of which is delicate. However, Diesel engineers say the actual results are negligible.

There are six cylinders to each Ardagan engine, arranged in sets of three, and mounted on a cast iron crank case of the enclosed type. The valves, four per cylinder, are all arranged in the cylinder heads and are operated from a crankshaft; on the port or starboard side, according to the engine. They are the air-starting, atmospheric-air inlet, fuel-injection, and exhaust valves, respectively, and as before mentioned are actuated by rocker-arms and short push-rods from a camshaft, which is in two lengths.

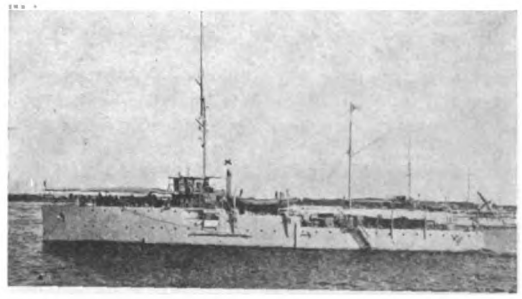


ENGINE ROOM ARRANGEMENTS OF THE MOTOR GUNBOATS "ARDAGAN" AND "KARS."

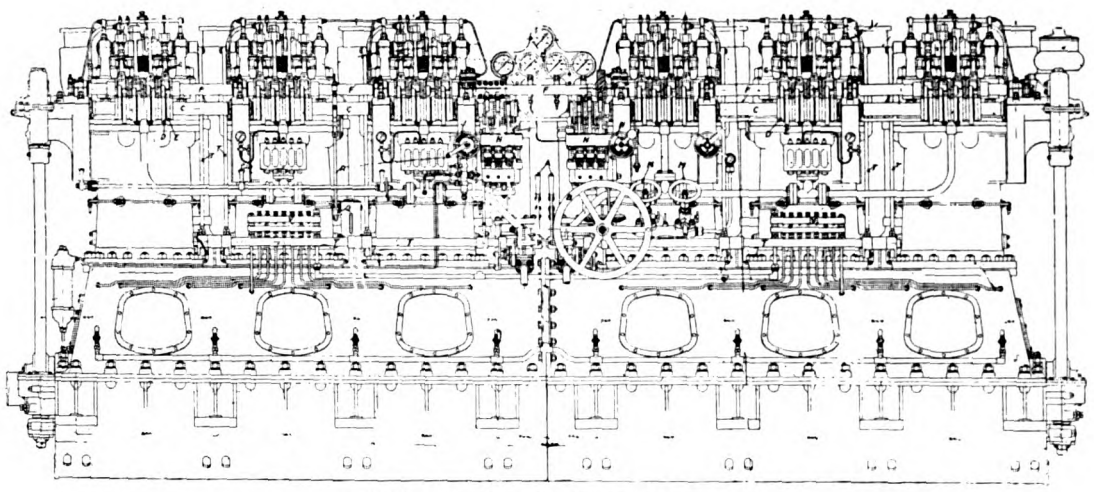
With regard to the eight shallow-draft gunboats, these certainly are most impressive-looking craft, and having no superstructure, otherwise than the gun barbettes, they make very difficult targets to hit. It is not at all improbable that the future motor-driven battleship will resemble them in appearance. There are also five steam-driven craft of somewhat similar design. Four of the motor vessels are named "Schkwl," "Smertch," "Graza" and "Schorm," but the names of the other craft are not available.

The "Schkwl" was put into commission in 1909, whilst the other three were in service in 1910. The remainder followed later. All are quadruple-screw boats, 233 ft. in length by 42 ft., 2 inch beam, with not over 6 ft. draught. Seeing that the hulls do not stand more than 10 ft. out of the water, excepting the barbettes, conning tower, and masts, it will be realized that they are peculiar looking craft, and different in every respect from "Ardagan" and "Kars." Constructed of heavy steel, with barrel decks, the upper work consists of five barbettes, one mast with wireless installation, two short and slender exhaust funnels, and boat davits fore and aft. The second barbette from the bow is extended upwards, forming the conning tower and bridge, which carries a powerful searchlight. The armament consists of two 6-inch guns and four 12-pounder quick-firers for each ship.

The propelling machinery consists of four Nobel



"Ardagan" and "Kars"—Two 1000 h. p. Russion Motor Gunboats, Each Driven by Two 500 h. p. Ludwig-Nobel Diesel Oil Engines. "Kars" Can Be Discerned Slightly Astern of "Ardagan."



ENGINES OF "ARDAGAN" AND "KARS."

Diesel-type oil engines, each developing 250 b. h. p. at 350 revolutions per minute on the four-cycle principle and driving its screw through a Del Proposto electric transmission gear, which gave the necessary flexibility, unobtainable from the early Diesel engines. The engines are of the four-cycle non-reversible class, each with four cylinders, 13-inch bore by 15-inch stroke. In each cylinder head are fitted three valves, namely an inlet, fuel-injection, and exhaust; starting evidently being by the Del Proposto motor, deriving the current from storage batteries. The valves are operated by rockers from a camshaft on the starboard side, which in turn is actuated by skew-gearing from a vertical shaft driven off the crank-shaft between the two central pairs of cylinders. The compressor for fuel-injection air is driven directly off the crank-shaft at the forward end of the engine. Fuel is forced to the injection-valves by plunger pumps operated by eccentrics at the after end of the camshaft. Lubrication is by force-feed, a sight-feed lubricating box being arranged between the fore and aft pairs of cylinders; there are seven drips from each lubricator, pipes being led to the various working parts. The crank case is of the enclosed type; but there are five large doors on either side.

These particular engines, not being reversible, had reversing carried out by means of the Del Proposto element. It was not long, however, before Ludwig Nobel was able to reverse the high-powered motors, and later boats have reversible engines. It is interesting to learn the first Nobel reversible marine oil engine was built nine years ago. The experiences of the Maschinenfabrik Ludwig Nobel are of no mean nature, as they have been constructing Diesels for 17 years.

Mr. Nobel first took up Diesel engine construction as a hobby, being a very wealthy man, and connected with the great Nobel oil interests; but it was not many years before his hobby developed into an enormous industry, which his country must now appreciate, because of the dozens of submarine engines that he has built since the war started. It is significant that one year before the commencement of the war he received an order for twenty-two submarine Diesel engines, each of 1200 b. h. p., so that Russia must now have some formidable submersibles in service.

FIFTEEN LARGE MOTORSHIPS FOR ONE COMPANY.

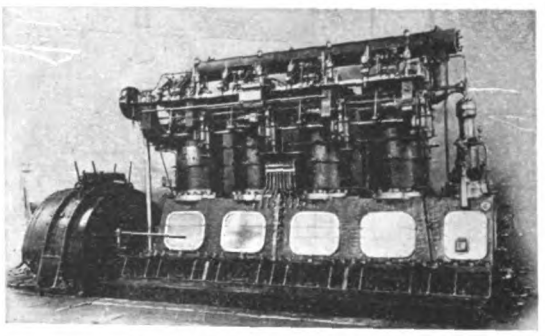
Three large twin-screw motorships have just been ordered by the North Star Shipping company of Stockholm (Nordstjernan company), and each of these vessels will be equipped with four-cycle type Diesel oil engines having a total output of 3,300 i. h. p. per ship, and this will drive the ships, which will be of 9,200 tons d. w. c. each, at 11¼ knots.

This well-known shipping concern already has six 6,650 d. w. c., 2,000 i. h. p. Diesel motorships under construction, and have six of similar power and size in regular service, namely, the "San Francisco," (illustrated in Motorship for October); the "Pacific," the "Kronprins Gustaf Adolph," the "Kronprinsessan Margareta," the "Suecia," and the "Pedro Christopherson," making a fleet of fifteen motorships all told.

The six ships in service and the six on order are 362 ft. long by 51′ 3″ beam, with 23′ 6″ draught, and have a dead-weight capacity of 6,550 tons, a gross tonnage of 3,730 and a loaded displacement of 9,625 tons. It will be realized that the d. w. c. is very large, the actual cargo space representing about 6,000 tons, or a little over.

These twelve ships give a comprehensive idea of how profitable is the building of standardized motorships. Each vessel has two six-cylinder engines of 540 mm. bore by 730 mm. stroke turning at 140 r. p. m., excepting the first two ships, which had eight cylinders of smaller bore and stroke.

In any event the second order of six ships meant the casting, or forging, and machining of 72 cylinders, 72 pistons, about 430 piston rings, 72 crank-shafts, 72 connecting rods, 288 inlet and exhaust valves, 72 fuel-injection valves, and other important parts in similar proportions virtually at the same time. Hence the cost of manufacturing can greatly be reduced in comparison



One of the Two 600 b. h. p. Nobel-Diesel Engines With Electrical Transmission Installed In the Old Russian 3000-ton Cruiser "Ruenda" as an Experiment. Both Engines Had to Make a Five-day Non-stop Run Before Acceptance.

with reciprocating steam engines with their varying sized cylinders.

The nine motorships on order for the North Star company will be used mainly for exploiting the company's services to the Pacific Coast, and partly for their Brazil and River Plate services. The total value of these motor vessels is 20,000,000 kromer ($6,000,000). American steamship owners will feel this competition keenly unless they, too, adopt motorships, and thus face the competition on a more equal basis.

McLAUGHLIN PROMOTED.

H. G. McLaughlin, the popular head of the gas engine department of the Fairbanks-Morse Seattle branch, has succeeded E. W. Currie as manager. Currie left Seattle to become general sales manager of the Air Reduction Co., of New York City, a $50,000,000 corporation, which is developing a chain of water power plants for the manufacture of chemicals from the air.

"PREMIERE ITALIA" NEARING COMPLETION.

The 120 h. p. Skandia engine for the new power schooner being built for Callao interests by Schultz & Schultz at Hunters point has arrived at San Francisco and will be installed during the coming month. This boat, a sister to the "Terza Italia," will be known as the "Premiere Italia." She is now nearly complete, and will be put in the water about the end of October. It is planned to start her out on the voyage south before the first of the year, and when she goes she will carry the 30-ft. power boat recently built for the same owners by H. Anderson. The latter boat is now complete, except the engine, which will be installed at Callao.

MOTORSHIP SAN FRANCISCO ON THIRD TRIP.

Swedish motorships of the Johnson Line are now becoming so familiar at San Francisco that their visits arouse but little comment, except among the numerous exporters of California products who find the service a very welcome, thoroughly adequate, relief from the difficulty of making deliveries to Europe. However, their handsome freight and passenger carrier, the San Francisco, recently in port on her third round trip, is perhaps worthy of more than passing notice as one of the first vessels built especially for the service between Stockholm and San Francisco, and appropriately named for that run.

The San Francisco was built about eighteen months ago at Copenhagen, Denmark, and is a steel vessel of 2,858 tons net, U. S. measurement, with a dead weight capacity of 6,550 tons. Her length overall is 378 ft., with a beam of 51.3 ft., and a draft of 23.9 ft. She is powered with a pair of 1,000 h. p. Danish Burmeister & Wain full Diesel engines, which under normal conditions run at about 140 to 143 r. p. m. when the ship is fully loaded, and up to 150 r. p. m. light. While this is her third voyage, the behavior of her engines, fuel consumption, speed, etc., have been practically constant.

Her voyage out from Stockholm, her home port, was via Magellan, and took 85 days altogether. This included a stay of three days at Kirkwall, after which her first port was Montevideo. Short stops were made here, and at several other South American ports.

On the first voyage she made Valparaiso without a stop in 41 days, keeping the engines in continuous operation; and the same could have been done this trip if desired. On the present trip out, with a comparatively light cargo, her average speed was between 11 and 12 knots, about 11¾ being maintained under normal conditions. She is more heavily loaded for the home trip, which will be made via Panama, and expected to make 10 to 11 knots, as she had averaged in the past when fully loaded. According to the engineer, the engine runs best on Solar oil, the fuel consumption averaging 6 to 7 tons daily, and never being much above or below those figures when run at the normal speed, which is done at all times as much as possible. The amount of lubricating oil used varied from 40 to 50 kilos daily.

The performance of the engines is pronounced excellent, and it is stated that there has been no occasion to shut down either of the engines at sea. They are, of course, cleaned up as far as possible at every stop, but were given their first real overhauling of the trip while in San Francisco, and all parts were found in perfect condition. Carbon accumulations in the cylinders or on piston-heads were said to have been absent entirely. A full set of extra valves is carried, and can be changed when convenient, though there has been no necessity for doing so.

In addition to the main engine, the San Francisco carries a 200 h. p. stationary Diesel engine, direct-connected with an electric generator, which not only furnishes light but drives all auxiliary equipment, including ten cargo winches and two windlasses, and a small motor generator set to furnish current for the wireless outfit. She is handled by a surprisingly small crew for her size, the engine room force including the chief and three assistant engineers and five "greasers." On deck there are the captain and three officers, and ten men in the forecastle, besides the wireless operator. Very comfortable quarters are provided for all hands, the navigating department being fully appointed; and there are also comfortable stateroom and saloon accommodations for 20 passengers. The vessel is now commanded by Capt. D. Lilliequist, with C. Holmberg as first officer, G. Carlson is chief engineer.

The Johnson line, represented in San Francisco by W. R. Grace & company, has now 21 vessels, six of which, engaged in European service, are 3,000-ton boats, and the rest larger, running up to 10,000 tons. Seven of the newest additions to the line are Diesel-powered, and of these four have been placed in the Pacific Coast trade, running as far north as San Francisco, where visits will be made every three months.

GOVERNMENT GAS ENGINE PLANT PROPOSED.

The Mare Island Navy Yard officials have requested the Washington authorities for authority to fit up a factory for the manufacture of marine gas engines for the use of the navy on this coast.

Motor-Driven Shoal Draft Vessels

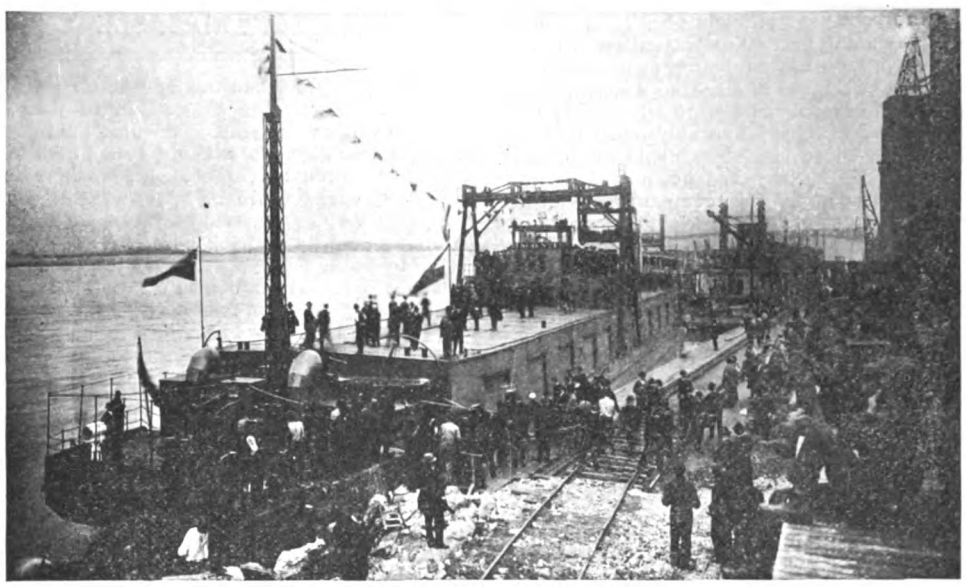
The four types of vessel herein illustrated and described are in use in various parts of the world, reviving a freight traffic on inland waters which had fallen away practically to nothing, and now made possible with the Diesel engine in opposition to locomotive transportation.

The "Inco No. 1" is operated by the Inland Navigation company between New Orleans and St. Louis on the Mississippi River and her operating expense has been brought down to a point where freight rates are 20 to 25 per cent under those of the railroads and about 15 per cent below those of the few steamer lines still operating on the Mississippi. Better speed is also maintained and while a freight train is making one trip between New Orleans and St. Louis the barge has made a round trip. The shipper has a further advantage in his goods being covered by insurance from the time they leave his premises until delivered to the consignee, all drayage and insurance costs being incorporated in the freight rate which still remains 25 per cent below that of the railroads, while with the latter the shipper has to pay drayage and the consignee still further similar costs when he receives the goods.

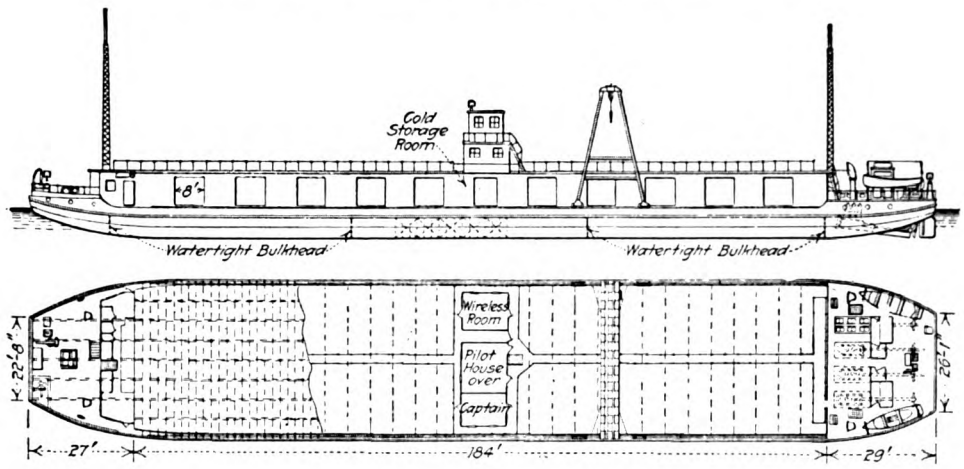
All these factors,—low freight rate, speed, efficiency, elimination of extra drayage and insurance costs, and a regular five-day schedule have brought to the first barge of the company more freight than it can handle, hence two new barges now completing and others on order. Co-operation between shipper and barge line is essential if the great natural transportation routes of our inland waters are to be reopened to traffic.

"Inco No. 1" carries 1600 tons and has been fully loaded on each trip. The new barges have a capacity of 1100 tons, the principal dimensions being 240 ft. x 32 ft. x 6 ft. draft, all being equipped with wireless. The electric traveling crane has made it possible to load or completely empty "Inco" in less than eighteen hours.

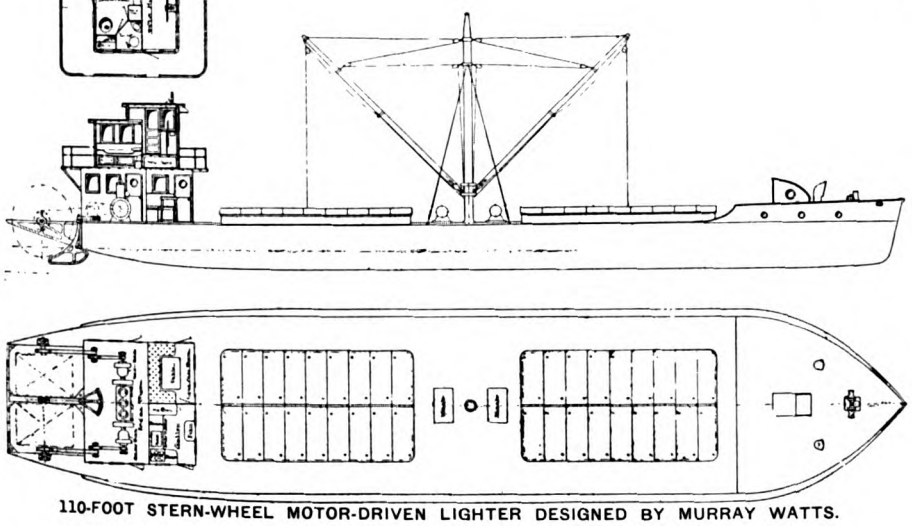
Fairbanks-Morse Diesels have been successfully used in "Inco No. 1" and are being installed in the new barges, their power plant consisting of 320 h. p. in four units of 80 h. p. each driving separate propellers.



"INCO No. 1"—MOTOR-DRIVEN BARGE OPERATING ON THE MISSISSIPPI.



PROFILE AND DECK PLAN "INCO No. 1."



110-FOOT STERN-WHEEL MOTOR-DRIVEN LIGHTER DESIGNED BY MURRAY WATTS.

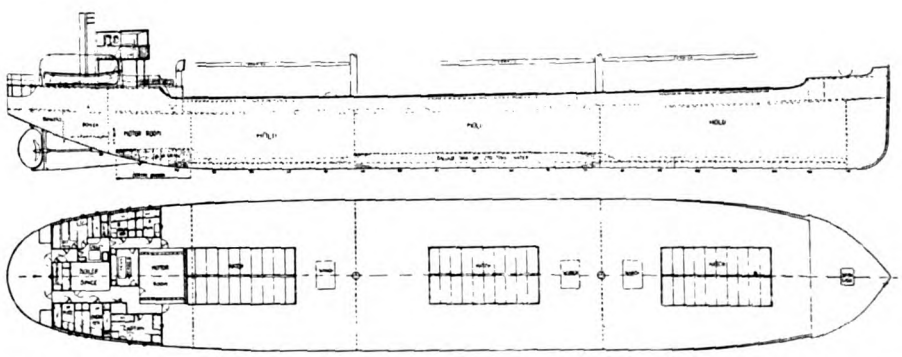
110-FOOT STERN-WHEEL LIGHTER.

Vessels similar in design have been in use for years throughout the world but propelled by steam engines, and their universal conversion to heavy oil or Diesel engines is only a matter of time, the saving in operating expense and cargo space becoming more apparent and convincing every day.

The stern-wheeler will always claim advantage in cheap construction over tunnel stern vessels which require small propellers with high revolutions for efficiency, and the field which is open today throughout the world for such vessels and which will be increased when the European war terminates is almost illimitable, and this apart from the inland waters on the western side of both continents from South America to Alaska which await the enterprise of man and the advent of the Diesel to open up territory and commerce which will run into billions of dollars.

ENGLISH MOTOR CANAL BARGE "OTTER."

This illustration of the old and the new method is most interesting as these inland waterways of England are among the oldest in the world. The horses used for towing the barges were notoriously ill-fed and ill-used and the oil-engine is doing a humane service in replacing them apart from demonstrating its superiority from a commercial and economic standpoint.



2000-TON LIGHTER "BALTIC" CONVERTED FROM STEAM TO MOTORS OF SWEDISH MANUFACTURE.

Craig-Diesel Engines for U. S. Submarines

T. ORCHARD LISLE

During the past year officials of several foreign navies have paid particular attention to the Diesel-type engine that is being constructed at the James Craig Engine & Machine works, Jersey City, N. J., and several tests were witnessed; and whilst they were most favorably surprised at what they saw, these engineers could not understand why the U. S. Navy had not adopted Craig Diesels; but, of course, this company previously had made no direct bid to the Navy Department, having desired to first have an extended record of engines in actual marine service.

In the recent award by the U. S. Navy Department two engines out of six required were ordered from the Craig firm. These engines are for installation in the submarines F-1, F-2 and F-3, which have been in service for some years, and which have been required to be fitted with new propelling machinery to replace the Vickers-type engines originally installed and now proven deficient. Owing to the need for installing the new engines in the existing machinery space and with the existing allowance for machinery weight, there are hard and fast restrictions on the size and the bulk of the new engines. The weight will not exceed 13¾ tons complete with all equipment.

At the same time it should be pointed out that in the days when American submarines were driven by gasoline motors the Electric Boat Co. built in 1905-1906, a large number of 300 b. h. p. engines from Mr. James Craig's designs. Just as these gasoline motors established confidence in this type of marine engine so the Craig-Diesel now is in its particular field, for it is free from unconventional and fantastical features of design, and is a practical achievement of sound engineering in full accord with the successful four-cycle European practice. In fact, one of the principal engineers of a great European Diesel-engine firm expressed his opinion to the writer that it was the finest of its power he had yet seen.

Before commencing the design of his first engine James Craig went to Europe and made a study of what was being done by all the great Diesel engineers, and saw for himself the reasons of success and failure of the different makes of marine heavy oil engines, and thus was able to avoid the pitfalls into which tumbled those who were too stubborn to be guided by the experience of others.

Consequently, he had undisputable success from the start without the suggestion of poor operation of even one engine. His first engine—a 100 h. p. set—he says he will not sell, but uses it as a demonstration machine at the works; but the first pair, each of 175 b. h. p., were installed in the yacht Aeldgytha, and for three seasons have given splendid results. The writer was privileged to be the only press-man on the trials of this vessel in 1914, when she made a 28½ hours non-stop run without any previous running after the motors left the works.

It is no wonder that a well-known Pacific Coast firm of marine distillate-engine manufacturers acquired the manufacturing and the selling rights of the Craig Diesel engine—we refer to the Union Gas Engine company.

Generally speaking, the sets for the submarines will be of standard design, but the peculiar circumstances connected with the installation as aforesaid will render them a little different from those supplied for other work. The following are the initial tests required, and the 24 hours non-stop run is a little more severe than most purchasers require for the test-bed trials:

1. A run of two hours at 150 b. h. p. and 250 r. p. m.
2. A run of two hours at 225 b. h. p. and 300 r. p. m.
3. A run of two hours at 125 b. h. p. and 325 r. p. m.

And while the engine is operating at these loads and speeds, the r. p. m. will not exceed 400 when the load is suddenly removed and the engine is under control of the governor.

4. A backing test of one hour at 225 b. h. p. and 350 r. p. m.
5. Twenty-four hours run at 300 b. h. p. and 350 revs. including two hours at 330 b. h. p. and 370 r. p. m.

These tests are to be completed within 48 consecutive hours.

Each engine has six cylinders, 12½ dia. by 15 in. stroke and will develop 300 b. h. p. at 300 r. p. m., and will, of course, be capable of running at considerable overload. The latter is one of the features in which the Diesel system has an advantage over steam engines, inasmuch as the overload in times of great necessity may be increased as much as 40 per cent; but upon this point we need not dwell at the moment. The indicated horsepower is equivalent of a 375 i. h. p. steam engine, or about 500 i. h. p. two-cycle-type Diesel oil engine; but, of course, it is the effective (brake or shaft) horsepower that counts.

With previous Craig Diesels the air compressor has been stationed at one end of the engine, but in the design before us it will be noticed that the cylinders are arranged in two groups of three, with the air compressor between them, in which position the best balance is obtained, particularly as it is not a cross-head-type of engine, where beam-lever operation is sometimes used in order to save overall length.

The frame work of the engine consists of a heavy bed-plate, which carried 16 forged steel columns, the latter carrying a cast-iron table on to which the cylinders are bolted, each cylinder being cast and fitted separately. All the columns are machined, as well as the cross-stays, to a nice finish, thereby adding to the appearance of the engine. Light steel plates, or doors, easily detachable, are fitted to the columns, and these act as splash plates.

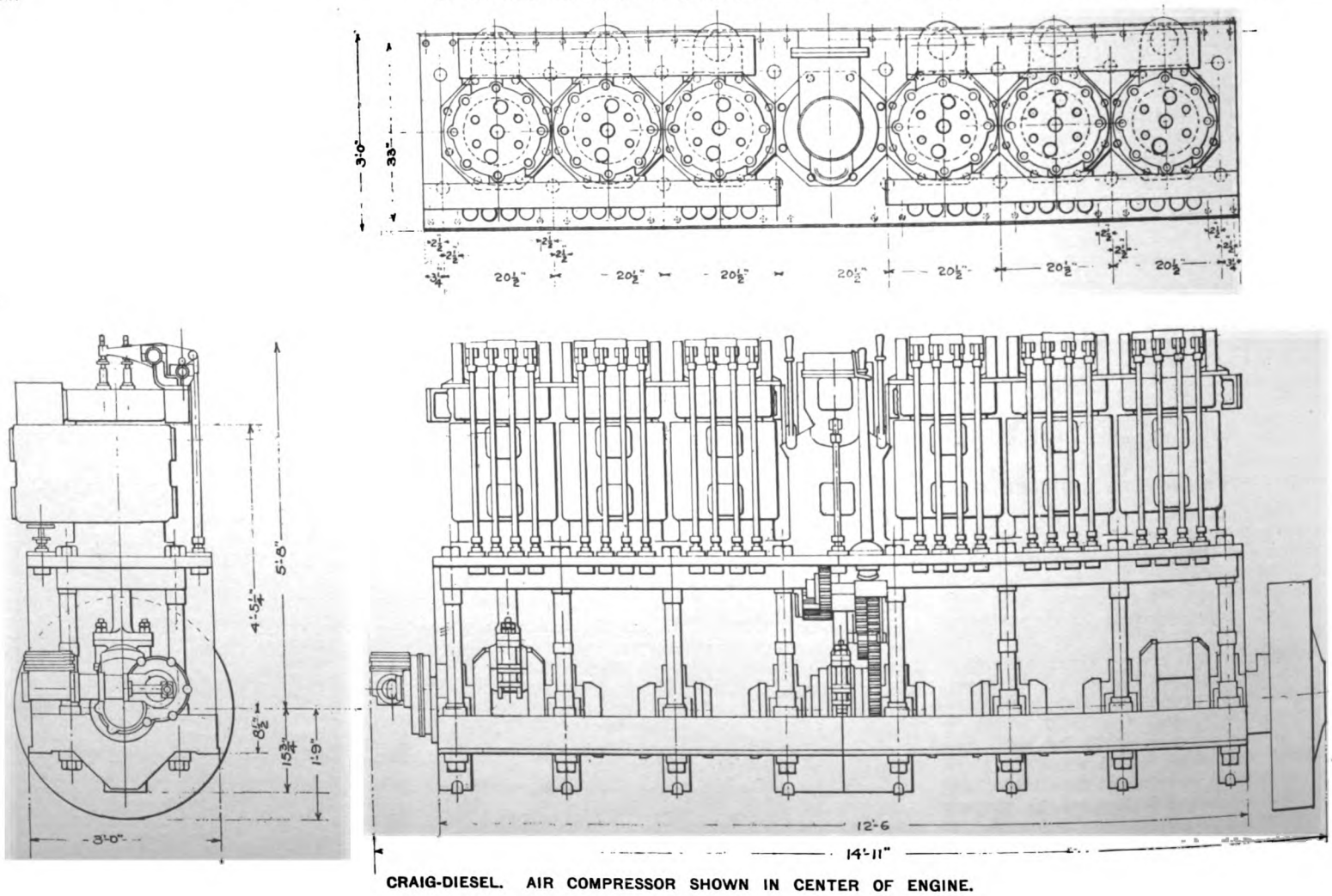
Craig found his exhaust-port, or lower exhaust system, so efficient in his high-powered gasoline engines that he retained it with the Diesel design particularly as excessive heat round the exhaust valves had been the bane of some makers of Diesel motors.

By turning to the sectional drawing of the cylinders we can see how this operates.

A. is the piston.
B. is the exhaust valve.
C. is the exhaust port, or lower exhaust.
D. is the valve controlling the exit of the exhaust gases passing out at (C.)

Now, when the combustion occurs, the piston (A) is forced down until it uncovers the port (C), when the pressure of the expanded gases forces most of the latter out and into the exhaust manifold via the valve (D), which is raised at the right period by the cam (E). Now, it does not matter much if the valve (D) becomes pitted, or a little warped, because at the moment when absolute tightness is required the port (C) is covered by the piston (A) and so forms an effective seal.

Not only does the lower-exhaust take care of 80 per cent of the gases, but they take care of



CRAIG-DIESEL. AIR COMPRESSOR SHOWN IN CENTER OF ENGINE.

the hottest part of these gases, yet they are not exposed to the intense heat of the combustion, nor does the lower exhaust-valve have to be opened against any internal pressure. Again, neither does the main exhaust-valve (B) open against pressure, for the auxiliary exhaust relieves the pressure within the cylinder before the main exhaust-valve is opened. In fact, the auxiliary exhaust is really the main exhaust, while the valve-in-the-head is merely an outlet for the entrapped gases, that are left. The main valve (B), of course, opens when piston (A) starts on the up, or scavenging stroke.

The use of this exhaust port has given the impression to some people that the Craig engine operates on the two-stroke cycle; but the Craig Diesel, like all other Craig motors, operates strictly on the four-cycle principle, thus following the practice of the most successful European engineers.

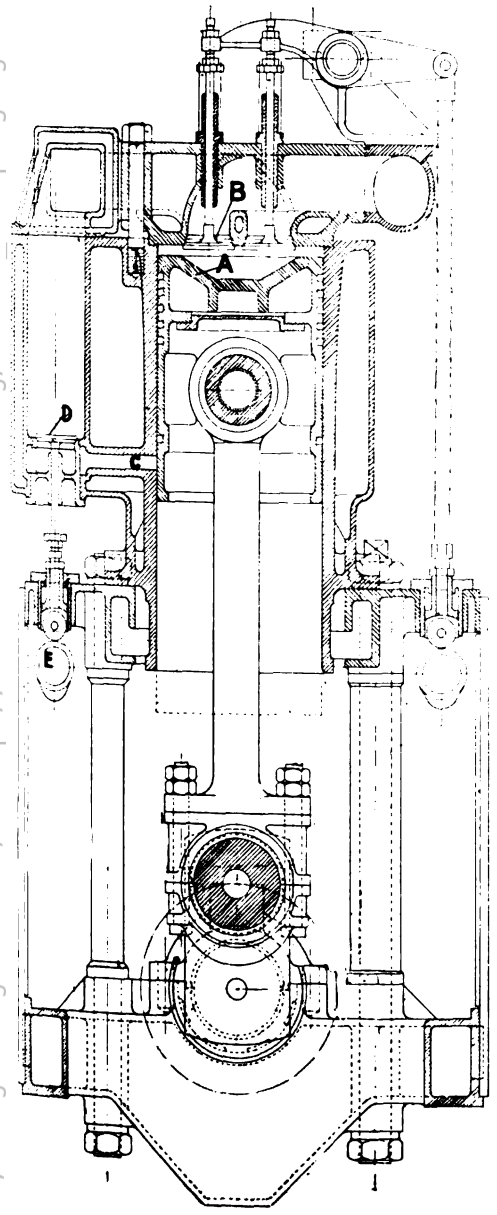
We will now give the maker's idea of the benefits to be obtained:

1.—When the piston uncovers the lower port on the firing stroke the valve located there is arranged to be wide open, and at this period, while the piston is moving slowly, the exhaust pressure is exitted therethrough, the cylinder contents being lowered to atmospheric pressure and correspondingly reduced in temperature. As the piston rises on the (exhaust) upstroke and just before it covers the port, the regular upper exhaust valves in the cylinder head are opened and the remaining cylinder contents are scavenged therethrough. On the next (suction) stroke of the piston the lower exhaust valve remains on its seat and precludes any exhaust gases being drawn back into the cylinder. This arrangement provides means for exitting all pressures and a great amount of violent heat through an auxiliary passage, thereby reducing the back-pressure on the piston during the exhaust stroke and increasing the M. E. P. an appreciable degree.

2.—It reduces the period during which the piston is exposed to the violent heat.

3.—The exhaust valves in the heads are on their cool seats for a longer period (of about 50 to 60 degrees of the crank angle), and when opened are moved against no internal pressure (only the tension of the spring), thereby greatly reducing the wear and shock to the camshaft devices. By reason of the great relief from heat and caustic gases afforded to the exhaust valves in the cylinder heads we are justified and warranted in affixing the same to the heads without detachable cages, thereby strengthening and simplifying the device and making it possible to provide two adequate valves with rational port area.

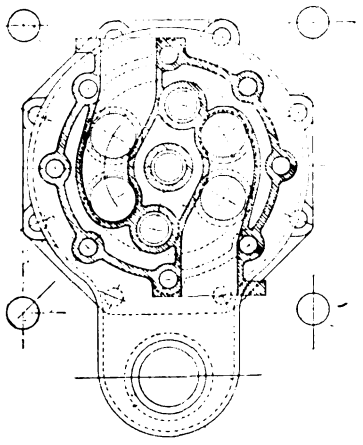
4.—Another important benefit attained is that the heat condition of the exhaust chamber and of the passageway in the cylinder head is not much different from that prevailing in the air-inlet passage, and all stresses and strains due to unequal heat conditions are minimized and practically eliminated.



Sectional View of Craig Diesel.

A study of the plan of the cylinder-head will show how nicely the design of the valve orifices has been planned. In order to get the correct area and yet obtain ample cooling-water spaces, two inlet and two exhaust valves are arranged for. Many Diesel engineers have always considered it strongly advisable to reduce the openings in the cylinder-head to a minimum, and theoretically this is so, but in actual practice it has been found that the number of openings is quite a minor factor, far more important being the amount of heat to which the head is subjected; also the manner in which the openings are designed. It is essential to have ample cooling-water space between the valves in order to prevent the water passages becoming clogged with deposit. This, as mentioned, has been fully complied with in the case of the Craig design. It may be added that the two inlet valves have a diameter of 3½ ins. with ⅝ in. lift, and if a single valve were fitted the diameter would be 7 ins. if the same lift were used.

Contained in, and affixed to, the cylinder table are the camshaft devices, one on the side and another in the rear side of the engine. The front camshaft is arranged with the cams and the connecting devices to operate all the valves con-

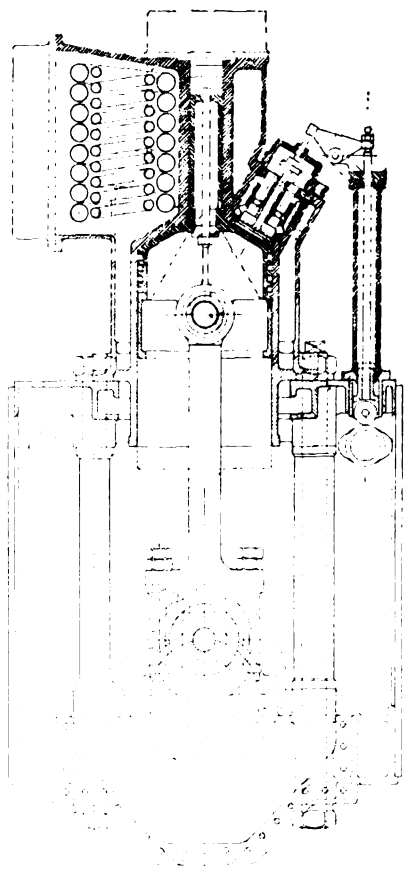

Plan of Cylinder Head, Craig Diesel.

tained in the cylinder heads. For each cylinder-head there is arranged a completely independent set of valve-operating rockers, shaft and bracket-bearing devices. Each shaft is arranged with two eccentric portions, one for the fuel-injection rocker and the other for the air-starting rocker, both so fitted and connected that when the eccentrics are in neutral position both devices (fuel and air-starting) are inoperative, and when in another position only the air-starting valve are operative, and when in a third position the fuel-valves only are operative.

The two bearing-brackets supporting these rockers and shaft devices are located equally on either side of the cylinder-head, and by detaching the two bearing-bracket caps the four rockers and shaft can be swung on the pins in the top of the push rods, thereby making it convenient to remove a cylinder-head. The cylinder-head can be relocated and the opening devices reconnected without disarranging the adjustments to the valve timings or settings. Two cylinder-heads can be removed from each three-cylinder group at one time, the others serving to hold the inlet pipe and exhaust pipe in their proper locations meanwhile.

By affixing to the front camshaft suitable cams arranged to function the valves of the ahead motion and suitable cams to function the valves for the reverse motion, together with suitable inclines on the sides of the cams to lift and lower the push-rods when necessary, and by arranging the camshaft to move longitudinally in its bearings, the engine is arranged to be reversible. The back camshaft is arranged with suitable cams to operate the back lower exhaust valves, and as this function of the opening and closing of the valve transpires equally on either side of the bottom center of the engine, it was possible to locate the ahead and astern cams on the front camshaft in reference to the cams on the rear camshaft, so that one cam on the back shaft serves for both go-ahead and for reverse motion.

The engine is arranged to start with air on all


Sectional View Air Compressor and Cooling Coil, Craig Diesel.

cylinders, and directly it acquires a positive revolution or two, then three cylinders are put on oil-fuel, and directly the engine indicates acceleration the remaining three cylinders are put on oil fuel. The engine may be reversed in 5 to 8 seconds of time.

A change from previous Craig Diesel engines is that the air compressor is in two stages instead of three, thus simplifying its construction and the arrangement of the inter-cooler. It is affixed to the cylinder table in the same manner as the working cylinders. The casting contains the cylinders of both stages and an extension at the side receives the cooling coils and the separator device, both of which are conveniently detachable for inspection, and the two pistons are in one casting. The air-inlet valve of the first stage is mechanically operated by cams located on the front camshaft and a push-rod device. There will be an automatic discharge valve for this stage, and both the suction and the discharge valves will be contained in detachable cages of the same size. The suction and the discharge valves of the second stage will be located in the cylinder-head, and will be contained in removable cages of the same size and will be automatic.

By far the majority of Diesel engineers adopt a separate fuel-pump for each cylinder; but one of the great European firms who really have been unusually successful with their engines found that one pump feeding all cylinders is far more easily adjusted. When it is realized that the quantity of oil to be injected is very minute, the advantage of a single pump will be more appreciated. In order to equalize the amount of the fuel delivered to each cylinder there will be provided calibrated distributing valves, conveniently located at each working cylinder, whereby the operator can regulate and properly apportion the amount of oil-fuel delivered to each cylinder, so that it performs equal work with the others. In this detail the practicing of the lower exhaust device affords another important benefit, as follows:

The exhaust test-cocks are arranged and connected to the lower exhaust passage and thereby afford positive, individual, audible, visible, and measurable, indication of the amount of work done in the cylinder, without any manifestation of the exhaust from the adjoining cylinders. This is effected by the fact that each test-cock affixed to its exhaust passage can only afford a demonstration of its own exhaust from the cylinder, because the lower exhaust valve is closed at all times, excepting when the piston uncovers the exhaust port on the firing stroke. Consequently there is never any doubt or confusion about the amount of work done by each cylinder and indicated by the test-cock. If the operator finds a cylinder doing more or less work than the others he can readjust the distributing valve.

America's First Diesel-Powered Passenger Vessel

"SUQUAMISH," AMERICA'S FIRST DIESEL-POWERED PASSENGER VESSEL.

Since the spring of 1915 a motor vessel has been engaged in a daily ferry service on Puget Sound, Washington, making two round trips of forty-four miles, or during each and every day she has covered eighty-eight miles with clock-work regularity. A careful record has been kept of her fuel consumption, and she constitutes one of the most convincing illustrations of the economy derived from Diesel propulsion.

No one operating, or contemplating the operation of a ferry service can afford to overlook the record of this most interesting little vessel.

The photograph well illustrates the character and general appearance of the "Suquamish." Her underwater form resembles that of a fast cruising type of power yacht having a long entrance, fair deadrise and easy bilge flattening into a long floor which terminates in a transom stern. The wetted surface is thus reduced to a minimum and constitutes an easily driven hull with considerable stability of form on a light displacement.

The dimensions are 92 ft. in length, 16 ft. beam and 5 ft. extreme draft. The displacement is 60 tons with construction reasonably light and no ballast carried.

The motive power consists of a 180 b. h. p. Nelsco Diesel turning a 52x52-inch three-bladed propeller at 340 r. p. m. (ten revolutions per minute less than maximum speed of engine).

The consistent speed of the vessel is 15¼ knots at which there is no vibration to speak of and the exhaust shows perfect combustion. An average of 400 passengers per day has been carried throughout the months of May, June, July, August and September. Her smooth running reliability and cleanliness draws additional patronage in spite of opposition. The performance of this vessel has been so consistent that the operating expense of the engine can be calculated to a cent.

Working hours, May to November, 1916.... 2,250
Fuel consumption (gallons).....15,006
Mileage run 24,300

Entire cost of fuel per hour, 14.4 cents.

During the present year of 1916 prior to going into commission no expensive overhaul was necessary to the engine and she has run throughout this summer with the same regularity as during the year of 1915.

W. L. Gazzam, president of the Kitsap County Transportation company and owner of this vessel, is a most enthusiastic supporter of the Diesel engine and although largely interested in steam vessels is of the opinion that it is only a matter of a few years when the latter must give way to the economic operation of the marine Diesel, as it is impossible to successfully operate a steam vessel in opposition. "Suquamish" was built by John Wilson, East Waterway, Seattle, from designs by Lee & Brinton, and launched April, 1914.

AUTHENTIC INFORMATION FOR SHIPOWNERS.

Recently a well-known firm of ship naval architects applied to our New York office for information regarding the operation of motorships, and as this information is likely to be of general interest we reproduce their questions and our reply. At all times we shall be glad to give shipowners similar authentic and reliable information, and such inquiries should be addressed direct to our New York office at South Ferry building.

From your experience with Diesel motors, can you give us the following information in a two 1250 h. p. installation with the usual amount of auxiliaries?

1—Fuel consumption per hour.
2—Lubricating oil consumption per hour.
3—Necessary crew needed for each watch.

The figures we quote are taken from vessels in ocean service under average conditions, and are not builders' guarantees. Of course, with different makes of engines the figures will vary somewhat.

You refer to an installation of two engines, each of 1250 h. p., so we will take two Diesel engines of 1360 i. h. p. (1020 b. h. p.) or equivalent to 1200 steam h. p. each, because we have records of two such ships (tankers).

Cargo capacity—two million (2,000,000) gallons; actual average of sea speed—11½ knots; propeller and engine speed—105 r. p. m.

We now will deal with your questions as follows:

(1) **Fuel consumption**—The total for both engines including auxiliaries at sea, is nine (9) tons per 24-hour day in summer, or 9½ tons in winter, which is equivalent to 0.31 lb. per i. h. p. hour in summer. The steam steering gear is operated during the daytime by a donkey boiler, having a specially large heating surface area, at 90 to 120 lbs. per sq. in. pressure. Deck boiler at 180 lbs.

(2) **Lubricating oil consumption**—This averages 35 to 40 gals. per day, or about 3 gals. per hour. But, with a conscientious chief engineer, may be reduced to about 2½ gals. per hour. (These, and all the other figures refer only to four-cycle ships.)

(3) **Number of crew in engine room**—Total staff twelve men, consisting of chief, first, second and third engineers, three assistants, three greasers and two cleaners. Donkey-men same as on steamer. Watches are maintained as is usual.

(4) Each engine has six cylinders, is 27' 3" long by 8½" wide, and weighs about 122 tons.

(5) We desire to point out that a steamer (coal or oil fired) carrying the same amount of cargo in her holds (6,000 tons without water, fuel, or stores) could not average the same speed (11½ knots) with the same power and revolutions, if bunkered with sufficient fuel to take her across the Atlantic. The steamer also would be much more expensive if built to do the same work as the motorship.

TUG FOR LOS ANGELES HARBOR.

The harbor commissioners of the city of Los Angeles opened bids October 12 for a gasoline towboat, as follows: Pacific Shipyard, Alameda, $12,500; W. S. Brusstar, Oakland, $12,500; Crowley Launch & Tugboat company, San Francisco, $9,250. The boat to be delivered on this contract is the Crowley No. 19, which is 65 ft. long, with a 110 h. p. S. F. Standard engine.

NEW TENDERS FOR ALASKA PACKERS.

Wm. Cryer has just started work on four new power boats for the Alaska Packers' association, to be used around the Bristol bay canneries. Two of them are to be 75-footers, with 110 h. p. S. F. Standard engines, and two 56 ft. long with 75 h. p. Standards.

STANDARD GAS ENGINE S. F. OFFICE.

The Standard Gas Engine company, which recently moved its main office to the plant, Dennison and King streets, Oakland, has located its San Francisco branch at 440 Market street, occupying the same quarters with the Emmons Draying company.

PRICE OF OIL AND ITS EFFECT UPON MOTORSHIP OPERATION.

On the 10th of October a notice appeared in the Atlantic daily press to the effect that the price of crude oils had increased 10 cents a barrel for the better grades and 5 cents a barrel for the heavier fuels, the new prices being as follows:

Pennsylvania crude, $2.50.

Cabell, $2.02.

Mercer black, Corning, and Newcastle, $2.00.

Somerset, $1.85.

Ragland, 85c.

We desire to dispose of the fallacy now existing in many quarters that the increasing price of crude oil will seriously affect the progress of motorship construction. This impression is partly due to the fact that in the early days of the motorship development shipowners were led to believe that the greatest advantage of the marine Diesel engine was its remarkably low fuel consumption, whereas the point which was not made clear was that it is the Diesel engine's fuel economy that enables a motorship to increase its earning power by carrying considerable more cargo than an oil or coal fired steamer, or by operating at low cost at such times as when running in ballast, or when only part cargoes are obtainable.

How little derogatory effect the increased price of fuel-oil will have upon motorships we will now proceed to illustrate by means of reliable figures. As a matter of fact increased prices may stimulate the industry because it will prevent many owners from ordering oil fired steamers, and the various disadvantages of coal leaves them with motorships as the sole alternative.

Let us take as an example a ship carrying 4,000 tons of cargo in her holds (not including bunkers, stores and water), at an average speed of ten knots across the Atlantic. She will need at the outside 100 to 120 tons of oil fuel per voyage of 15 to 16 days, so that 300 tons in her bunkers will be more than ample for a round trip from New York to London and back, including auxiliaries at sea and in port; hence she can fuel at New York each round trip. The average consumption at sea will be six tons per 24-hour day, as proved by ships in service.

The new price of Pennsylvania crude oil is $2.50 a barrel or about $17.50 per ton. Let us assume that most unusual conditions have sent the price of this oil up to $4 a barrel, or roughly $28 a ton, which is extremely unlikely to happen. Such an event would mean that the daily fuel bill of the motorship would be $168, or a total of only $2,520 to $2,680 for the voyage from New York to London, or $8,400 for the round voyage and stops in port. Now, if the price of oil increased to such an abnormal extent, the increased cost would be due to high current freights; hence the extra 800 tons of cargo that the motorship would carry would be worth more than the total amount of the fuel bill. In other words, an increased cost of oil fuel means greater earning powers for the motorship, which obviously is an extraordinary state of affairs.

Now let us take the fuel cost of a motorship using Pennsylvania crude oil at its present increased price of $2.50 per barrel. Six tons, or 42 barrels per 24-hour day at sea, amounts to $105. Thus, if the vessel used 300 tons for the return voyage from London to New York and back, including operating the auxiliaries in port, the total fuel bill would amount to but $4,500, which every shipowner must agree is extraordinarily low. To any one having doubts about this, we shall be pleased to show the necessary substantiation.

We shall very much appreciate receiving from some shipowner interested similar fuel costs data regarding actual coal and oil-fired steamers of the cargo-carrying capacity.

TWO HUNDRED DIESEL-DRIVEN TRAWLERS.

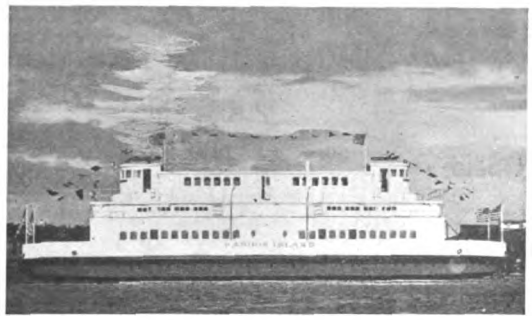
A persistent rumor is now circulating the financial district of New York that the allied governments are negotiating in this country for a fleet of 200 Diesel-driven trawlers to the total value of $30,000,000, and that the Submarine Boat corporation, which controls the Electric Boat company and the New London Ship & Engine company, is actively after the entire order. Each boat is to be 100 ft. long and will have one, or two, four-cycle Diesel-type engines totalling 500 b. h. p. They will be used for mine sweeping and patrol purposes.

First Diesel of Pacific Coast Manufacture

The first Diesel engine to be constructed on the Pacific Coast has just been put into operation at Seattle, in the county ferry "Vashon." This vessel is a double-ended scow of V bottom form, 120 ft. o. a., equipped with a six-cylinder 11½x14 four-cycle Atlas oil engine of the full Diesel type, developing 330 b. h. p., at 290 r. p. m., operating on calol or Diesel fuel oils with a consumption of 43 lbs. per h. p. hour.

At each end of the engine is a clutch built integral with the flywheel, engaging propeller shafts which swing a 76-in. propeller at each end of vessel. A hand wheel with longitudinal shafting and racks engages the one clutch whilst disengaging the other. The reverse motion being obtained by disengaging the after or driving propeller and engaging the forward one for slowing and reversing. The air starting mechanism operates upon three cylinders only, which for the time being are converted to two-cycle by an eccentric cam movement of the valves operated by a hand lever.

A representative of Motorship being given the opportunity of inspecting the engine after the trials took place, found that from stone cold to full operation on fuel with all six cylinders firing took about five seconds. From full load in either direction to neutral takes two complete turns of the hand wheel controlling the clutches (or two seconds), when the engine instantly throttles down on the governor which controls the full supply. There is a noticeable absence of vibration and noise, it being possible to converse



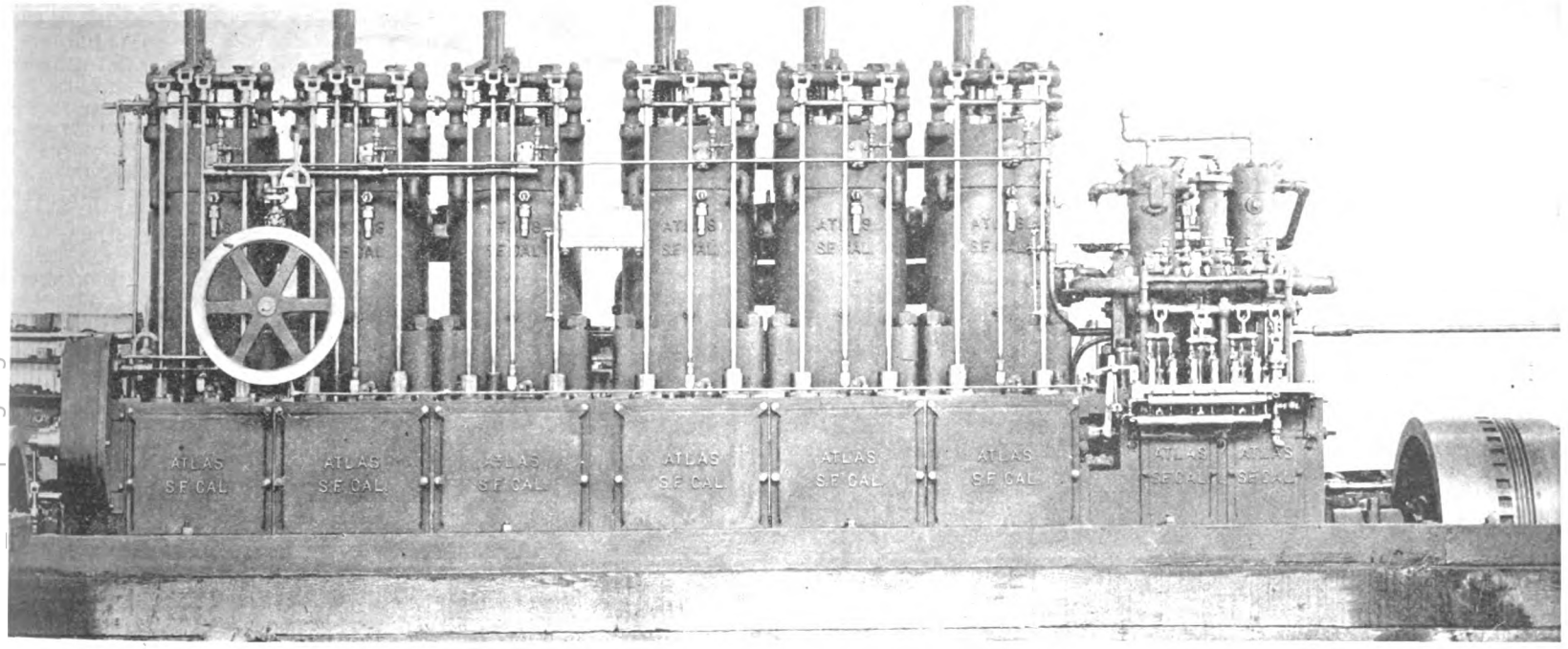
KING COUNTY FERRY "VASHON."

while inspecting the engine in operation. There is a total absence of fumes, odor and loose oil. There is no heat. There is not a single nut or screw but which is getatable with an ordinary spanner, and each part will come away without disemboweling the engine. The cut gears are steel on an iron shell filled with pitch which kills the ring. The cam shafts are 2½-in. dia. The cams have steel eccentric points with large wearing surface, and the cylinder castings contain 25% steel.

The lubrication is accomplished by both force-feed and gravity, the former being for the cylinders and wristpins, the latter for the bearings. On the main bearings there is also an emergency system by means of oil rings that will accomplish sufficient lubrication for some time even if the other system should fail. The cranks have a positive splash system in addition. Consumption of lubricating oil is 1½ pts. per hour.

From an engineer's point of view she is a beautiful job and the installation has been well carried out.

This Diesel is designed by A. Warenskold, president of the Atlas Gas Engine Co., who has, during a few months, performed a feat which hitherto took years to accomplish. We await the results of this engine's performance in regular service with considerable interest.



ATLAS DIESEL IN FERRY "VASHON." FOUR-CYCLE, 320 B. H. P.

PETTER OIL ENGINES IN AMERICA.

Ship owners and others connected with the marine crude oil engine development will hear with interest of the arrival in America of Mr. Ernest W. Petter, the chairman and managing-director of Petters Limited, of London, Yeovil, Glasgow and Bristol, who have been constructing oil engines for twenty years, they having an experience second to none in this particular field. Owing to their various British works being over-crowded with government work it is their intention to open up works in America.

Mr. E. W. Petter, M. I. Mech. E., chairman and managing director of the parent company, and who has been largely responsible for the success of that undertaking, is in America organizing the proposed American company, and is in treaty for a suitable plant. He is also in touch with men having the necessary qualifications and experience, with a view to their appointment as officials of the proposed American company. The parent company will immediately furnish to the proposed American company complete sets of working drawings of all sizes, together with all the drawings of tools, jigs and gages necessary to enable the proposed American company to proceed immediately with the manufacture of these engines, and the parent company will enter into an agreement with the proposed American company for a full interchange of all information, advice and assistance between the two companies, and will establish mutually reciprocal arrangements between the two companies. And further, the parent company will loan to the proposed American company such of their skilled designers, superintendents, foremen, pattern makers and other of their experienced officials as may be necessary to give the proposed American company the information and assistance necessary to commence manufacture.

Petters Limited, the parent company above referred to, was formed in England in 1910 with a total capital of £100,000, ($500,000 approx.), of which £80,000, ($400,000), was cash. This capital was increased in 1913 to £105,000, ($525,000). The company paid dividends on its preference and common stock from the commencement, the dividend record on the latter being as follows:

For the first financial year ending March 31, 1911, 7½%.

For the second financial year ending March 31, 1912, 8%.

For the third financial year ending March 31, 1913, 10%.

For the fourth financial year ending March 31, 1914, 10%.

For the fifth financial year ending March 31, 1915, 5%.

For the sixth financial year ending March 31, 1916, 10%.

The business for the year 1915 was temporarily affected adversely owing to the outbreak of the European war.

The net profits increased from £10,088,110, ($50,442), for the first financial year ending March 31, 1911, to £31,522, ($157,610 approx.), for the last financial year ending March 31, 1916. These profits were arrived at after making ample allowance for amortization of premises and machinery plant, bad and doubtful debts, and after payment of all expenses, which included considerable advertising appropriation, outlay on new patents and patent fees, and after payment of the fixed remuneration to managing directors, but before deducting income tax payable in England and commission on profits to the managing directors under their agreement with the company.

In addition to paying the above dividends the company has built up a general reserve fund and a special fund to meet losses in connection with the war amounting to £37,000, ($185,000 approx.), and has an undivided carried forward balance of £6,700, ($33,500). Thus, under so successful a management there can be no doubt as to the success of the American company, particularly as the Petter crude oil engine has such a splendid and world-wide reputation.

SUPPLEMENT TO SOUTHEAST ALASKA COAST PILOT.

A supplement to the fifth edition of the Coast Pilot for Southeast Alaska has been issued by the U. S. coast and geodetic survey, and is a valuable contribution to the navigational literature of Alaska. It contains a compilation of the results of surveys and of other information received since the publication of the original volume in 1908, also the dangers located by wire-drag operations in recent years. This supplement will be of much value to the fishermen operating in this region, and they may obtain a copy free by applying to the Washington City office, or to any of the sub-offices of the bureau.

MOTORSHIP

A journal devoted exclusively to Commercial Motor Vessels and their operation. Issued on the 25th of each month.

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AN OPEN LETTER TO STEAMSHIP OWNERS.

Sirs: Facts are superior to theories and suppositions, therefore we put facts before you.

There are ships in service that carry 4,100 tons of cargo (not including bunkers, water and stores) at an average speed across the Atlantic of 9 to 10 knots on a fuel consumption of under six (6) tons of crude oil per 24-hour day.

Such ships are motorships. Other sizes offer similar results.

It is said that nothing is impossible; but it is impossible for an oil or coal-burning steamship to do this and comply with the law and Lloyds.

Do you know that a motorship (Diesel-driven) which will carry 4,100 tons of cargo in her holds costs less to build than a steamship?

This contrary to the prevailing impression; but actually is the case, so here again we have facts disproving theories.

Yours obediently, MOTORSHIP.

"AROUND THE YARDS."

To sit on a balk of timber inhaling the sweet perfume of the freshly sawn lumber and drink in the beauty of a fine vessel in construction is just about as near heaven as some of us will ever approach.

The song of the saw, the buzz of the pneumatic drill, the clink of the hammer and the plunk of the maul, makes music which the gods knew not of. Lulled into a sweet somnolence we picture the vessel full-and-bye, reeling off the knots as she lifts and surges on each big comber, settling with a sigh as it passes harmlessly beneath her and rushes away to leeward with head erect like a playful colt. The smell of the pitch, the straining creak of the gear, the rainbow formed by the spume ere it melts into invisibility, and the extra half turn of the wheel which she asks for as another old man playfully nudges her weather quarter and buries her bows deep in a smother of foam. "Steady there!" "Aye aye, sir, just a little wild on the helm, sir, a bit frolicsome like and can you blame her, sir, with a breeze like this? Maybe a few more feet of mizzen sheet would be to her liking."

The shrill yard whistle arouses us from the portals of Heaven; it's eight bells alright, and a crew of sturdy workers files past in search of food. Does one of them ever think of his work as being classic? We doubt it. Great God what they miss. F. C. B.

A WORD OF CAUTION.

Shipbuilding enterprises are being organized in practically every port in this country. The majority are worthy projects, but at the same time some of them, we are sorry to say, have the appearance of being promoted with the design of separating the trusting investor from his money. We urge that prospective purchasers of stock exercise due caution and secure advice from authoritative sources before investment. With the indiscriminate rush of people now going into the shipbuilding business it is not unlikely that some of them will meet with misfortune with accompanying serious losses to investors.

MOTORSHIPPING JOURNALISTS AT THE WAR.

The editorial staff of our British contemporary, "Motorship and Motorboat," are "doing their little bit" for their country. Mr. A. P. Chalkley, the editor, is in Mesopotamia in connection with the Red Cross motorboats, whilst Mr. Donald V. Hotchkiss, the sub-editor, after 11 months in Belgium (including dispatch riding at Ypres), now is a sub-lieutenant on board H. M. motor-launch No. 43, on the east coast of England. The motor-launch No. 43 is one of the 500 eighty-six footers built by the Elco company of Bayonne, N. J., at their Montreal yard, and engined by the Standard Motor Construction company of Jersey City. The British naval men running them characteristically dub them "orange boxes." Our contemporary, we are glad to say, is being produced each week, and we understand is being temporarily edited by men non-eligible for the front. We wish "Motorship and Motorboat" a safe voyage through a trying time and may she come through with all hands and a full cargo.

ALL CREDIT TO THE ENGINEERS!

W. P. Murphy, who installed the main engine and auxiliaries on the "Great Bear," recently wrecked in the Arctic, writes: "Fine article you had on the 'Deutschland'—but you forgot to mention the most important man aboard—the engineer. Wish you luck and hope you continue to devote your paper to commercial motor vessels."

Mr. Murphy is correct in saying that the engineer was the most important man aboard the "Deutschland"—but we did not by any means forget him. The reticence of officials of the operating company prevented our publishing a good many details regarding the construction and performance of that most interesting vessel.

MOTORSHIP ACHIEVING A WORLD-WIDE CIRCULATION.

Subscription orders for Motorship are coming in in a very gratifying way from all parts of the United States, Canada, Europe and the Orient. It is evident that this journal is beginning to be recognized as an authority in its specific field. It is our aim, as its support increases, to continue to improve the character of its editorial service to the highest possible degree. We believe that Motorship will exert a most powerful influence in the advancement of the commercial motor vessel. We extend our thanks to our many friends for generous assistance extended in the establishment of this journal.

DANUBE MOTOR GUNBOATS.

From all accounts the Austrians have in the past two years created practically an entire motor fleet the major part of which does service on the Danube. The German A. E. G. has established workshops at Budapest, where internal combustion engines are built and repairs effected. About a dozen small monitors are believed to have been completed at Budapest and Linz, all, or nearly all of which are propelled by oil engines. They are probably very small craft of the "tinclad" variety, mounting one or two quick-firers in a turret, and having 2-in. armor plating over vital parts. The older vessels of this class were a great trouble to the Serbians, who had nothing to oppose them until the arrival of the British naval detachment with launches and torpedo gear. One monitor, the "Temes," was then destroyed by a mine in the Danube in November, 1914, while a second one was torpedoed and sunk by a British picket boat in the following April. In addition to the monitors, a large number of vedette boats were commissioned by the Austrians during the Serbian campaign, some being specially built and others converted from pleasure launches. The original Austrian river flotilla consisted of ten boats, six of which were driven by petrol or benzine motors. The largest was 36½ tons, and could do 14 knots, but there were two of 25 tons which could travel at 25 knots. All were armed with machine guns. A number of these little craft are known to have been destroyed in the course of the war.—From "Shipping Illustrated."

SOMNOLENT AMERICAN MANUFACTURERS.

Within a few months one foreign manufacturer has booked orders in this country for five million dollars worth of semi-Diesel marine engines. In this one instance at least American manufacturers seem to have been caught napping.

THE ENGINEER QUESTION.

The article in last month's Motorship entitled "Where Are Our Oil Engineers to Come From?" has attracted much attention amongt the San Francisco shipping men who are interested in Diesel installations, as well as among engine manufacturers and agents; and the principal ideas brought out in the article are in general in accordance with the experience of shipping men, especially the opinion that the engineers to operate the large oil fuel units that are going in now will be found among the marine steam engineers.

Without wishing to disparage the gas engineers, several of the men who have been putting in heavy oil engines feel that those on this coast, with possibly a few exceptions, have had their experience entirely in handling boats of a comparatively small nature; and however expert they may be at such work, its problems are altogether different from those connected with handling a large vessel with powerful engines in the conditions apt to be encountered off shore. Further, it is also held that there is a great difference between the operation of the customary gasoline engines and those designed to use heavy oil, in view of which the adaptation necessary is not much greater in the case of a steam engineer than one accustomed to gas. The latter may in cases be well fitted to operate the smaller installations of the Diesel type, especially those designed for use in the vicinity of harbors, etc., but it is considered doubtful if many will succeed under deep-sea conditions. Aside from the educational advantage usually possessed by the marine steam engineer, the latter is familiar with handling large power and to meeting the many emergencies that are certain to arise frequently at sea; and this is the principal requirement of a marine engineer, regardless of the source of the power he handles. It is said, however, that the oil engineers soon to be needed will be recruited from the young and ambitious men now in steam, those who are able to recognize the merits of the new type and try to make the most of it; not those who are set in their opinion of the excellence of the steam engine, and suspicious of innovations.

It is worth noting in this connection that the first large oil engine installation on the coast has completed a long voyage without trouble, with an engineer who had no previous oil experience. In the case of another recent installation, the steam engineer coached for the job took hold in good shape, but fell sick, and two gas engineers were tried out with rather doubtful results before he was well enough to resume the work.

ENGINEERS FOR MOTORSHIPS.

Discussing the question of engineers for motorships with an important official of the Standard Oil company, the latter told the writer that they had found this the most serious matter to be said against the use of oil engines for ships. "It is," he said, "quite a different problem to that faced by the British shipowners, because British engineers are intelligent men, who previous to going to sea, served a proper apprenticeship in engineering works, and so generally are most capable mechanics, which is not often the case with the engineers aboard American ships. Even on our steamers," he continued, "we find it difficult to keep the men on the job, and they come and go. So with a motorship they quit just as they have learned to operate the machinery." Thus the engineer question is not merely limited to motor vessels.

FROM THE STANDPOINT OF THE READER

Contributions appearing in our columns come from many sources and widely separated points. It is not possible to verify all statements made, nor do we attempt to vouch for same. The function of this journal as we see it is to gather and reproduce all matter pertinent to the field which it represents, and without either favoritism or prejudice. Our columns are wide open to all manufacturers, designers, operators, etc. Motorship itself is not partisan in the slightest degree toward any type or design of engine. Our platform is solely that we are for the marine internal combustion engine and the motor-propelled vessel 100 per cent.

ARE YOU A SUBSCRIBER?

If not, and at all interested in the subjects appearing in "Motorship," you should send in your subscription.

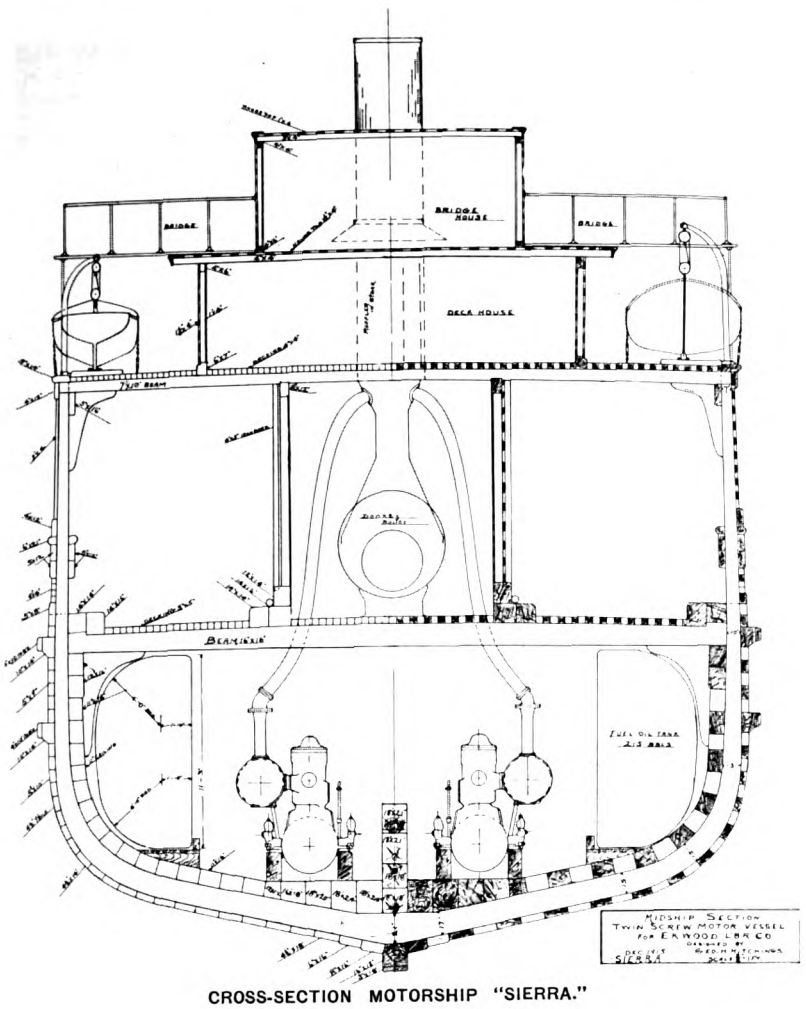
MATHEWS SHIP YARD BUSY.

At Hoquiam, Washington, snugly ensconced in a sheltered Grays Harbor back-water, is one of the busiest and most picturesque shipyards we know of, where an old-world atmosphere pervades amongst primitive surroundings. For twenty years it has steadily contributed its liberal share of vessels to the bosom of the Pacific, totaling fifty in all, notable among which was the steamer "Ecelsior," which brought the first load of gold to San Francisco from Alaska. Sailing schooners, steam schooners, auxiliary schooners and motorships have passed down its ways making history in shipbuilding.

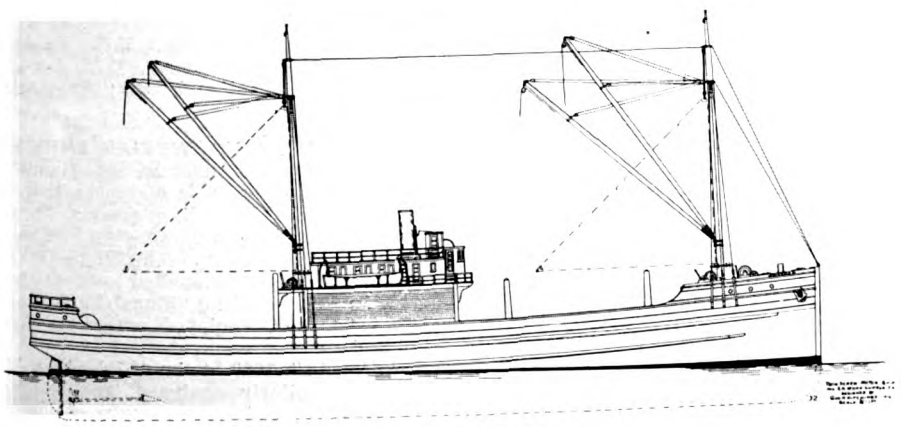
The founder and father of the industry, P. Mathews, has passed away, but the son, G. F. Mathews, continues to uphold their well-earned reputation.

The "Sierra," designed by George H. Hitchings, recently launched and illustrated in this issue, is the latest Mathews product. She is owned by the E. K. Wood Lumber company, her dimensions being 210 ft. o. a., 45 ft. beam, with a draft of 15 ft. In type she is locally called a double-ended motor schooner, the appellation being given to former vessels of the type equipped with steam, where the navigating bridge and engine space is amidship, separating a fore and after hold. Her power consists of a twin set of 320 b. h. p. Bolinder semi-Diesels, and has an estimated capacity of 1,200,000 feet of lumber.

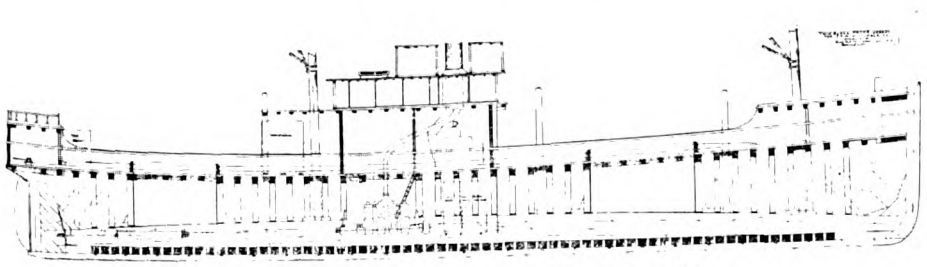
"Sierra" is too small for the Australian and China trade, but will operate between Pacific and South American coast ports.



CROSS-SECTION MOTORSHIP "SIERRA."



ELEVATION MOTORSHIP "SIERRA."

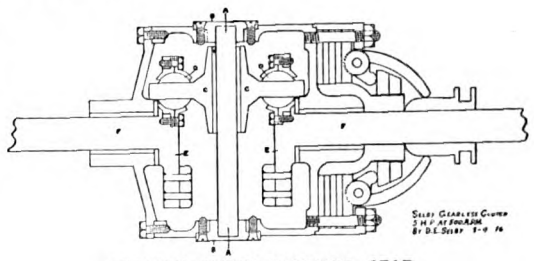


MOTORSHIP "SIERRA" SHOWING "HOGGED" KEELSON.

SELBY GEERLESS REVERSE CLUTCH PATENT APPLIED FOR.

This reverse movement applied to clutches of the multiple disc type was invented by D. E. Selby, of Seattle, and is manufactured solely by the Markey Campbell Machinery Co., of this city. It has been in constant use for five years in and around Puget Sound in sizes from 3 to 75 h. p. In operation it is absolutely noiseless.

Reference to the sectional drawing and illustrations will assist in following the description of operation:



SECTION SELBY REVERSE GEAR.

(a) Is a hardened steel stationary bar.

(b) Are caps or plates holding bar (a) in position.

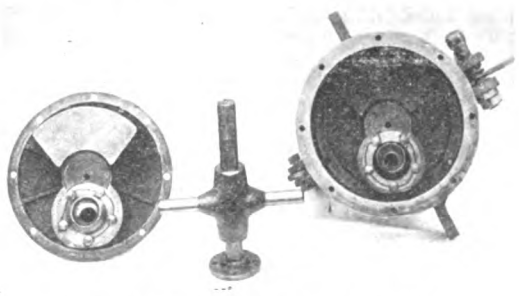
(c) Is a crosshead with brass bushing operating on bar (a).

(d) Are ball bearings in which the arms of the crosshead operate.

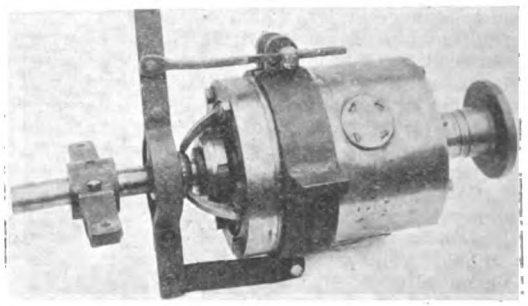
(e) Are crank webs with balance weights.

(f) Shafting.

The bar (a) constitutes a fulcrum when the shell of the clutch is held rigid by brake band, the forward arm of the crosshead giving the reverse movement to the after arm of same and thereby to the shaft. In following the circle described by the crank webs the crosshead slides upon the bar (a).



SELBY REVERSE GEAR DISSEMBLED.



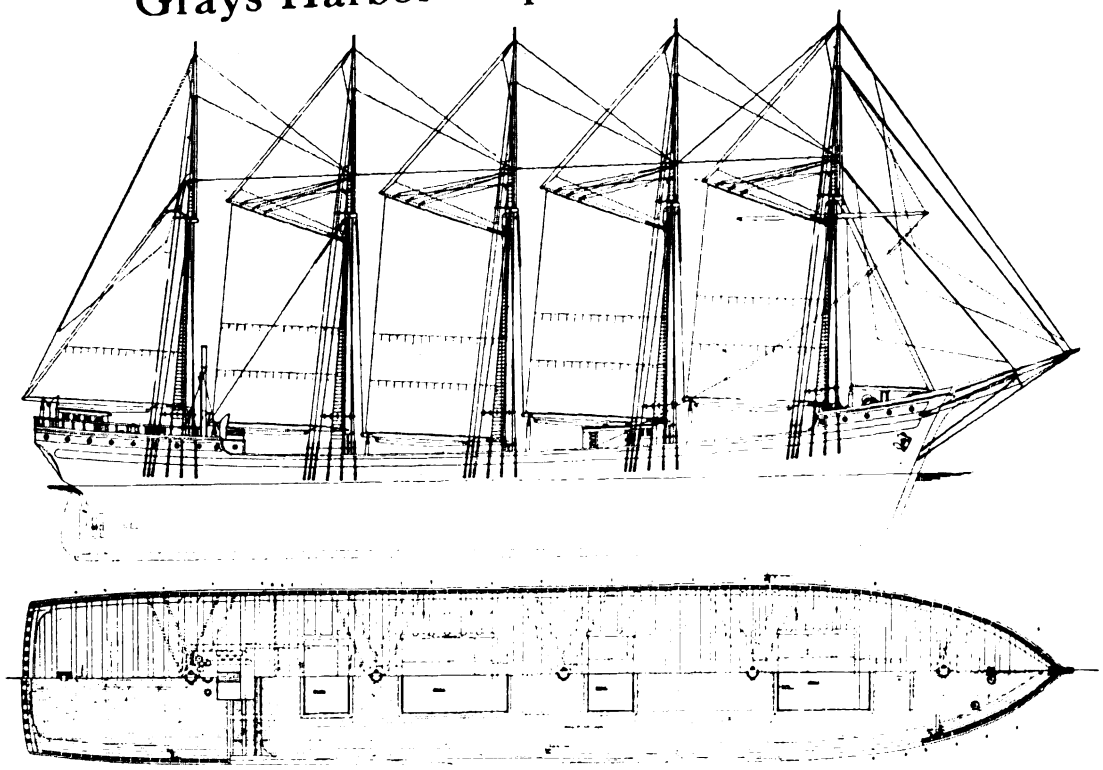
CLUTCH CONTAINING SELBY REVERSE GEAR.

The distance increasing and decreasing as the webs revolve in opposite direction is permitted by length of crosshead arms. The ballbearings adjusting themselves to the various angles assumed by the crosshead when in operation. This device has withstood the hardest kind of usage for years and will be of considerable interest to the trade.

NINE HUNDRED TONS CARGO SPACE GAINED.

The motorship "Monte Penedo" can carry 900 tons more cargo than a steamer of similar dimensions. Two hundred tons of this cargo space gain is due to the saving in weight and space effected by the Diesel machinery, the remaining 700 tons being due to the enormous reduction in the size of the fuel bunkers. Her 1700 b. h. p. (2500 i. h. p.) machinery only weighs 150 tons complete. By dispensing with 10 firemen she saves $3,500 per annum in wages alone, also much worry. When being driven at 10½ knots loaded she uses about 7½ to 8 tons of fuel per 24-hour day.

Grays Harbor Shipbuilding Company



LUMBER SHIPS FOR SWAYNE & HOYT BEING BUILT BY GRAYS HARBOR SHIPBUILDING CO.

An additional order has been placed for four more vessels identical to the two now being completed by the above yard at Aberdeen, Wash., (for Swain & Hoyt, of San Francisco). During a recent visit to this yard by a Motorship representative a careful survey of these ships was well rewarded by the evidence of first-class workmanship and material from bow to stern. They are well proportioned vessels of massive construction, which will meet with approval in the eyes of Lloyds and the Bereau Veritas. That they have received well-merited attention is proved by the additional orders from American and Norwegian shipowners, and in further evidence of progressive originality, the vessels have been standardized the same as in former years we standardized small pleasure vessels.

The former practice of shipowners embodying individual characteristics in their vessels has been swept by the board and succumbed to present day practical methods of utility and economy.

The shipbuilder, therefore, who produces a well built lumber carrier, which will also answer the requirements of general freighting, and who by standardizing his output saves time and material in construction, is going to receive the favorable attention of the buyer. Such immediate success has attended the efforts of Mr. A. Schubach along these lines that arrangements have been made for two other shipyards to construct eight more of the Grays Harbor Shipbuilding Co.'s standard lumber schooners, the second being the Olympia Shipbuilding Co., and the third at the moment withheld from publication, but which we know is bona fide.

There are features embodied in the Grays Harbor company ships which differ somewhat from the regular conventional practice in wooden ship construction of today. They have a hogged keelson which at midlength reaches in height and supports the 'tween deck beams, for the purpose of preventing hog fore and aft. A double arched brace is also introduced of strap iron ⅞x14 in. being mortised into the outside of the frames running from the turn of the quarters to the underside of the chainwales, then down to the curve of the shoulder. There are 1x4 in. diagonal iron straps, four each side by way of mast partners and beams, and heavy tie-rods and turnbuckles by way of hatch combings.

Some excellent work is evident in the fitting of large natural-crook breast hooks and knees in bows and forefoot. What little dubbing is required on the frames, both for ceiling and planking, is carefully faired down, both plank and ceiling facing solidly on the frame and nicely snugged at back edges with close caulking seam inboard and outboard. Viewed from their lower hold one is impressed with the transverse bracing afforded by the 'tween deck beams and the manner in which they are kneed and fastened. These vessels will be subjected to terrific strains and perhaps at no time more than with a heavy quartering sea. They are bound to work and the art is to provide for it and not against it, with steel trussing which will, if improperly introduced, shear and become worse than useless. It may be well to add that steel trussing between frames and planking has been used in a diagonal lattice form by both Eastern and Western builders in the past, and also prior to this was in general use in England conforming to Lloyd's requirements.

The original sheer as shown in the drawings has been maintained and the spring aft which some builders lose in the turn of the quarters is exceedingly pleasing to the eye. The deck line aft may by some be considered a little full and giving the appearance of flatness to the sides in their short curve to the quarters and transom. The poop deck would stand a reduction if these vessels were fined aft at the deck line in this way as it (the poop deck) is about the size of a city block, but these are minor details after all.

F. C. B.

NEW YARD CONTRACTS FOR SIX MOTORSHIPS.

The American Shipbuilding company, Harry B. Spear, president, has been awarded contracts for six wooden motorships to be built in its new yard at Warrenton, Oregon, each vessel to have a capacity of 2,000,000 feet of lumber.

The company is largely composed of Spokane capitalists, including Judge A. L. Flewelling, general manager of the land department of the Chicago, Milwaukee & St. Paul Railway. This company is the owner of large timber holdings in the Puget Sound district, and it is probable that their fleet will be employed in handling lumber shipments in the export trade.

NEW FERRY FOR TACOMA.

Pierce county commissioners at a recent meeting voted an appropriation of $30,000 toward the construction of a ferry to run between Gig Harbor and Tacoma.

Plans for the new ferry are being prepared and bids will be called for in the near future.

PRICE OPENS OFFICE IN PORTLAND.

J. H. Price for the past five years general manager and supervising architect of the St. Helens Shipbuilding company of St. Helens, Oregon, has resigned from this position to open offices in Portland as naval architect and consulting engineer. Carl Christiansen, who was trained under Mr. Price, will succeed him.

ST. HELENS SHIPBUILDING COMPANY.

Following closely upon the completion of the "City of Portland" two three masted fore-and-aft auxiliary schooners were launched from the above shipyard at St. Helens, Oregon. They are sister ships named "June" and "Ruby." The former, which adorns our front cover, was originally built for Capt. Wrightson, who sold her to M. T. Snyder, of New Orleans, and then immediately built the "Ruby." Each vessel is 165 ft. in length, 36 ft. beam and 13 ft. depth of hold. "June" is equipped with two 100 b. h. p. Fairbanks-Morse co-type motors. With her first cargo consisting of lumber, she made the run from Portland to Astoria, a distance of about 100 miles, at the rate of 7 miles per hour when fully loaded, engines running cool and easy, and consuming 97 gals. of fuel, and 12 gals. of lubricating oil during the 11 hours and 40 minutes occupied in the trip. This vessel is now on her maiden voyage to Balboa. The "Ruby" is now fitting out at the St. Helens ship yard, and receiving her engines, which are also Fairbanks-Morse of the same type and power, following which she will go into commission at an early date.

Both schooners are nicely sparred and spread a considerable area of canvas. The same careful detail has been followed in their rigging as was devoted to their design and construction, the fine points which catch a sailor's eye such as the correct lead of the chainwale plates, with the set of the shrouds, the rake of the lower masts and the slight forward spring to topmast heads, everything taut and shipshape, and their hulls as fair as an egg shell, both below and above water, are all there to be admired.

J. H. Price, late supervising architect of the St. Helens Shipbuilding Co., not only brought this yard immediately to the front with a reputation for first-class workmanship, but he combined considerable beauty in the design of these vessels. That his plans for the "City of Portland" should have been selected by the British Columbia government as the design to be followed in construction of that government's subsidized vessels is no small compliment.

OLYMPIA SHIPBUILDING COMPANY.

An order has been placed with this recently organized company, of Olympia, Wash., for three vessels from the plans now standardized by the Grays Harbor Shipbuilding Company, of Aberdeen, these two companies being associated insofar as the brothers E. R. Ward and M. R. Ward (recently of Seattle) being the respective managing heads.

The large orders which both ship yards have obtained were placed through A. Schubach, of Seattle. The dimensions of the vessels which both companies are now engaged upon are 290 ft. over all, 48 ft. beam, 27 ft. moulded depth, with a capacity of 2,225,000 feet of lumber. In rig they are five masted fore-and-aft schooners, fitted with topmasts, and each to be equipped with twin sets of oil engines of the Diesel or semi-Diesel type, aggregating about seven hundred b. h. p.

The incorporation of the Olympia Shipbuilding company with a capital of $50,000, with the following officers: President, E. R. Ward; secretary, P. H. Carlyon; treasurer, C. J. Lord, president of the Capitol National Bank; vice-president, J. L. Peters.

VISIT OF NORWEGIAN SHIPOWNER.

Capt. Louis Hannevig, of Hannevig Bros., Christiana, Norway, is making a tour of the Pacific Coast shipbuilding centers, including San Francisco, where a large steel steamer is being built to their order.. The Hannevig Bros. have operated motor propelled vessels for several years past, including "Fingal," a fourmasted bark of 4,000 tons, euqipped with twin 150 b. h. p. Bolinders.

"Elfreda," 1900, twin 120 b. h. p. Bolinders; "Lota" similarly equipped, and which was lost on Sable island recently. In conversation with a representative of Motorship Capt. Hannevig stated: "We are likely to place orders on the Pacific Coast for both steel and wooden vessels to be powered with Diesels if favorable prices can be obtained. The material, workmanship and character of the wooden vessels being built is excellent and something very superior to what I expected to see."

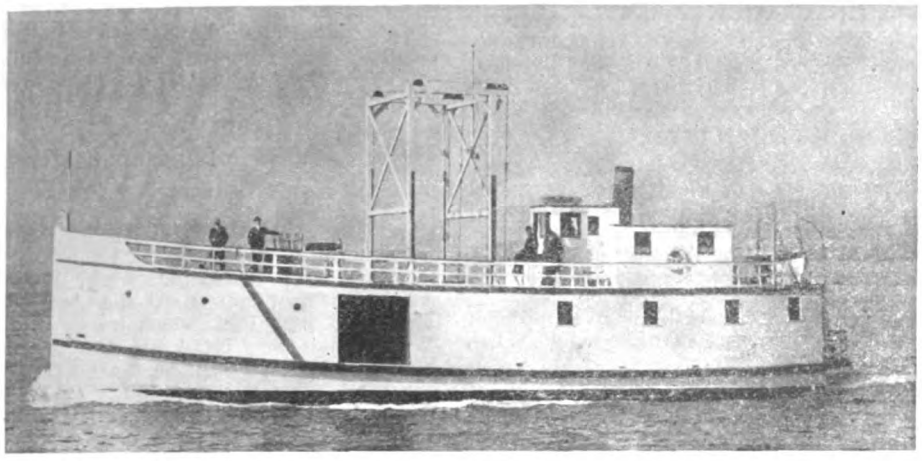
LARSON STARTS FOR SWEDEN.

Portland foundries will manufacture Diesel engines of Swedish design if the efforts of J. Fred Larson, the executive head of the Heath Shipbuilding company of Portland, Ore., are successful in securing the U. S. A. manufacturing license. Mr. Larson may also return with additional contracts for wooden vessels.

"ALOHA" IN COMMISSION.

For the benefit of our foreign subscribers it may be necessary to first explain that this type of vessel is known to us as a "transport" and used as an auxiliary to fast passenger and transportation lines for overflow freight which requires quick transportation, the handling of which is facilitated at either end by a built-in elevator. They may not be beautiful to look upon, being constructed to meet special requirements.

Aloha is owned by the Navy Yard Route (H. B. Kennedy, president), operating a fast passenger service between Seattle and Bremerton, with other calls on Puget Sound, Washington. Her dimensions are, length 80 ft. o. a.; beam, 21 ft., 7 ft. depth of hull, and 4 ft. draft. She measures 77 tons net. Was designed by Fred Ballin, of Portland, and built by Wilson ship yard, of Seattle. The elevator was constructed by the Seattle Machine Works, and is driven by the main engine, consisting of a 75 b. h. p. Fairbanks-Morse Type Co. oil engine of 3 cylinders, 10½x12½, swinging a 48-inch four-bladed propeller at a normal engine speed of 340 r. p. m. A speed of 10½ miles was attained during the trials on a consumption of 7 gals. of Union Special fuel per hour.



TRANSPORT "ALOHA."

This engine, which is equipped with an electric starter, is under full operation from stone cold within 40 seconds.

A 3 h. p. Fairbanks-Morse gas generating set gives electric light throughout, and also is used for air compressor.

Aloha meets all requirements of the owners satisfactorily.

NORWEGIAN ARCHITECT VISITS PACIFIC COAST.

In conversation with Otto Kahrs, who has recently arrived in this country from Norway, a Motorship representative gathered some very interesting information from this gentleman who is an expert consulting engineer, specializing in Diesel work for years past and who is thoroughly conversant with the Diesel situation in Norway, Sweden and adjacent European countries. Mr. Kahrs, upon his arrival at Seattle, was unfortunately misquoted through the medium of the daily press as having stated that "it was practically impossible to have Diesel engines and vessels built on the Pacific Coast." What this gentleman intended to convey was that his interest lay in Diesel engines of from 1,500 b. h. p. and upwards, which we are not yet manufacturing.

Mr. Kahrs, after supervising the installation, made the voyage to New York as owners' representative and consulting engineer aboard the M. S. "Hamlet," a new motorship on her maiden voyage and owned by Messrs. Brmsgaard Kiosterud and Company, of Drammen, Norway. This vessel is a tanker of 6,700 tons d. w. c., equipped with twin Diesel engines of 1,650 b. h. p. each of the Polar type manufactured by A. B. Diesel Motorer, Stockholm, Sweden. The development of the Diesel on the continent has long passed the experimental stage and is attaining colossal proportions in its extensive use. Fishing boats numbering thousands are equipped with semi-Diesels in small sizes. The activity in shipbuilding is also stupendous, the earliest deliveries now obtainable in Holland for contracts placed today for large steel vessels being 1919.

Mr. Kahrs will visit all Pacific Coast shipyards and may place orders for Norwegian interests. U. S. Diesel manufacturers should make a point of meeting this eminent Diesel expert.

DOMINION GOVERNMENT LIFTS BAN.

H. H. Stephens, M. P., Vancouver, B. C., wires from Ottawa to the effect that order in council has been passed granting permission for Norwegian ships to be built in British Columbia.

Shipbuilding contracts totally $10,000,000 have been held in abeyance pending this assurance.

A DIRECTORY OF MOTORSHIPS.

The Eads Johnson Publishing company, of 30 Church St., New York City, publishers of "Johnson's Steam Vessels on the Atlantic Coast," is compiling a directory of United States motorships, and is desirous of obtaining all available information for this purpose. This deserves the immediate assistance of all interested.

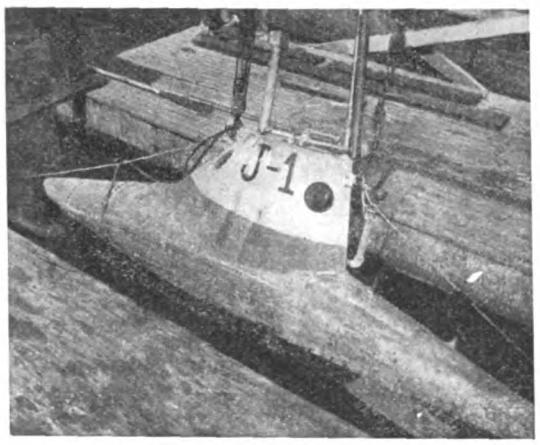
ATLAS GAS ENGINE CO. EXPAND.

The demand for marine oil engines of the Diesel type has been actively recognized by this enterprising company, of Oakland, Cal., who are erecting a machine shop 350 ft. by 80 ft., solely for the manufacture of Atlas Diesels. A 50-ton traveling crane will facilitate the handling of these heavy engines, and trackage for flat cars will connect the old and new buildings.

Atlas Diesels from 110 b. h. p. to 400 b. h. p. are now in course of construction.

NOVEL TYPE OF SUBMARINE.

Milton J. Trumble, president of the Trumble Refining company and also of the Trumble Gas Trap company, both of Los Angeles, startled the people of Southern California recently, by announcing that he has completed a successful one man submarine torpedo boat. He prophesies that this craft will revolutionize warfare at sea, owing to the ease with which it can be submerged and brought to the surface, as well as the high rate of speed which is possible. The boat was built by the Western Piping & Steel company of Los Angeles, and has been tried out at Alamitos Bay. She is but twenty-five feet long, equipped with a 110-h. p. Van Blerck engine, and, it is claimed, has shown a speed in excess of thirty-five miles per hour, almost completely submerged. Under normal conditions, all except twelve inches of the conning tower is submerged. The tanks may be



TRUMBLE SUBMARINE.

flooded and emptied quickly, but the usual method of submerging is by means of an easily reversed propeller on the bottom of the keel. Wings are arranged near both bow and stern, which give the craft some stability, as owing to the extreme narrow beam, it is cranky enough to topple over with a touch.

The breadth is but twenty-eight inches, although the draft of the model is seven feet.

The boat is equipped with two torpedoes of special design, and Mr. Trumble states that he can sink the largest ship afloat, alone and unaided, and that his invention will mark the passing of the heavy dreadnaught.

He states that he is almost sure to escape uninjured, owing to his ability to submerge quickly and to make an almost instantaneous getaway, no gunner being able to catch a boat which can change its speed and course so easily; also that he can construct these boats at a cost of $5,000 each, it being possible to ship six of them in an ordinary box car. He states further, that he expects to sell his patents to some government, preferably to the United States, and that several offers are already under consideration.

McCORMICK MOTORSHIP COMPLETES TRIP.

Charles R. McCormick & company have received cable advices of the arrival of their new motorship, "City of Portland," at Port Pirie, Australia, September 29, and are awaiting complete mail report of her performance on the latter part of the trip. From the time of her arrival to October 15 she was on demurrage, waiting for dock space, but is now being discharged and will soon start on her return trip. The entire voyage from St. Helens, Ore., to Port Pirie occupied 51 actual sailing days, of which 36 were spent on the trip from Honolulu to Port Pirie. Her engines were run at slow speed throughout the voyage, the average speed of the vessel being about 8½ knots, in line with the earlier report; and their performance has continued satisfactory, but no further details have been received.

It was feared when the "City of Portland" started that fuel oil of the kind required could not be had at Port Pirie, which was the reason for extreme caution in using fuel; but it is now found that the Standard Oil company can furnish an ample supply at that port, and the engines will be turned over at the normal speed on the home trip. The homeward run will accordingly be of fully as great interest as the trip out. She will bring coal as far as Honolulu, and island products from there home.

The "City of Portland" is in command of Capt. Olaf Johnson, with E. H. Kennady as chief engineer. Mr. Kennady has been with Charles R. McCormick & company for the last four years, all his experience prior to the launching of this vessel having been with steam, and he is given considerable credit for the satisfactory results obtained. To provide for the future developments in marine engineering, all the engineers of the McCormick company are getting their licenses endorsed for internal-combustion engines.

Charles R. McCormick & company have sold the plans and specifications of the "City of Portland" to Brown & company of Montreal, who are preparing to build a large fleet of motorships on the same lines at Vancouver and Victoria, B. C., under subsidy from the Canadian government. The McCormick interests will also continue the construction of vessels on this model. The No. 2 motorship at the St. Helens yard will be launched about November 15, being a duplicate of the "City of Portland" except that she is two ft. deeper. Motorship No. 3 will be launched about a month later.

COMPARISON BETWEEN DIESEL AND OTHER POWERS.

The actual performance of a vessel using fuel oil under boilers, Seattle to New York, compared to same vessel using Diesel engines of same, 1200 i. h. p. horsepower. Vessel is 224.3'x41.2' x20.6'—1497 gross tons and carries 1,300,000 feet of lumber or 2000 D/W tons under hatches.

Steam vessel noted in foregoing left Puget Sound, had to call at San Francisco, 60 miles extra running for fuel, at a cost for the extra time and running of $500. Had to take oil at Panama at $1.20 per barrel; had to run out of her way 100 miles into Norfolk, Va., taking oil at $1.10 per barrel, duplicated this on return voyage. The Diesel could have made the round trip on proper tankage without losing any cargo space and without refueling.

Vessel took 31 days, and comparison is made on a "side and side" performance, without regard to the lessened initial cost of a smaller sized vessel required for same tonnage having the Diesel engine.

STEAM POWER VESSEL—Per Month.			DIESEL POWER VESSEL—Per Month.		
Crew.			**Crew.**		
Master	1	$200	Master	1	$200
Mates	3	250	Mates	3	250
Engineers	4	420	Engineers	4	380
Firemen	4	150	Greasers	3	135
Oilers	4	150	Sailors	6	270
Water tender	1	45	Messboys	2	70
Sailors	6	270	Wireless operator	1	50
Cook	1	70		21	$1425
Messboys	2	70	Food, 21 men, 31 days		504
Wireless operator	1	50			$1929
	25	$1675	Calol Fuel Oil, at ½ pint per H.P.H., 744 hrs. time at 75 gals. per hr, 55,800 gals. at 2¼c		1255
Food, 25 men, 31 days		600	Lubricating Oil		98
		$2275			$3282
Fuel oil at an average of 85c per barrel, 3100 bbls.		2635			
Lubricating oil		67			
		$4977			

Gain, Diesel over Steam, in fuel consumed, and crews' keep and wages, 31 days $1695

STEAM		DIESEL.	
Deck Department.		**Deck Department.**	
Master	1	Master	1
Deck Officers	4	Deck Officers	4
Boatswain	1	Boatswain	1
Carpenter	1	Carpenter	1
Quartermasters	4	Quartermasters	4
Seamen	12	Seamen	12
Watchmen	1	Watchmen	1
Deckboys	4	Deckboys	2
	28		26
Engine Department.		**Engine Department.**	
Chief Engineer	1	Chief Engineer	1
Asst. Engineer	3	Asst. Engineer	6
Junior Engineer	3	Greasers	4
Deck Engineer	4	Electrician	2
Water tenders	3		13
Oilers	6		
Firemen	9		
Storekeeper	1		
Electrician	1		
	31		
	59		39

In addition to the economies shown in the foregoing, consideration in favor of the Diesel must be given:

To increased cargo space, owing to removal of boilers, and use of smaller space for oil fuel, and placing of same in the space usually unused; placing of engine aft, giving clear cargo working space. Gain in D/W by decreased fuel weight; fresh water tankage and contents weight gained, also boiler water weight. Decreased liability on account of decreased number of men. Gain in time by no delays or extra calls for fuel en route.

To ability to purchase fuel in cheapest market; no fuel standby expense. No boiler cleaning days required. Decrease of crew quarters and gain in space. No smoke on boat, clean ship, little labor cleaning and less paint required. With six or more cylinders, ability to run, if even one should be out of order. Steady continuous power, no firemen or their moods to consult, whole of operation under one control.

To automatic throttling of engine, preventing racing. Ability to make repairs not confined to large shops, any ordinary shop with small tools can make all needed repairs.

To ability to start on a minute's notice without preparation. Absolute lack of fire danger from fuel or engine. Use of exhaust gases for heat. Coolness of engine room for hot climates, no glowing furnaces, everything watercooled, hence no heat section on ship to spoil cargo. Shorter shaft tunnel and shaft needed, thus saving cargo space, attendance and upkeep.

To engine room force easier to work with, smaller number, and all mechanical men.

To no hidden parts, as with boilers, all in sight for attention and adjustment.

A FAMOUS SHIPBUILDING FAMILY.

In the year 1873 there came to San Francisco three brothers, Winslow G., Henry K. and Isaac Hall, who had previously been engaged in shipbuilding on the East Coast at Boston, Mass. Commencing with their first vessel a two-masted schooner The "Annie Gee," they built 83 vessels up to the year 1896, which included the "E. K. Wood" and the "Inca" the first four and five masted schooners built on the Pacific Coast.

The name of Hall Bros. grew famous throughout the world. In 1881 the firm removed to Port Blakeley, and in 1900 to its present location at Winslow, Washington. In 1903 the Hall Bros. Shipbuilding Co. was absorbed by The Hall Bros. Marine Railway and Shipbuilding Co., at which time Henry K. Hall, the one surviving brother, disassociated himself actively from shipbuilding.

The original firm had 108 vessels, ocean going, and of considerable tonnage to its credit. Yet with the decline of shipbuilding in after years they, like many others elsewhere and equally famous, were almost forgotten. Today with the

JAMES W. HALL.

renewed activity in wooden shipbuilding their name is once more revered. Men who are now foremen in the new ship yards of today are proud to state that their training was acquired in the Halls' yards.

James W. Hall alone remains to continue the good work of his ancestors, and following his late father's example (Henry K. Hall), his yard at Eagle Harbor has turned out the high class workmanship with which the name Hall is synonymous. The decline of shipbuilding gave James W. Hall but scant opportunity to produce anything over 100 feet, but the workmanship was there. We hope with all others to see the opportunity arise enabling the son to reestablish this famous name in modern shipbuilding.

HELLMUTH NOW WITH SCRIPPS.

H. P. Hellmuth until recently with the Gray Motor Co. is now domestic sales manager of the Scripps Motor Co.

REVERSIBLE PROPELLERS VS. REVERSE GEARS.

Editor Motorship: Will you kindly explain why the reverse propeller in large sizes for use in commercial vessels is receiving so little attention in this country? I had occasion recently to obtain prices upon such a propeller for a vessel 80 feet in length. Few propeller manufacturers took the trouble to reply, and those who did quoted me prices entirely out of proportion to the cost of a clutch for an engine of 150 b. h. p., the size then being installed in the vessel in question.—C. E. B., Wis.

In order that a motor-driven craft should be capable of running astern, the engine must be directly reversible, a reverse gear may be employed, or reversing propellers fitted.

The limitations of direct reversibility are well known, and if the manufacturer does not make his engine capable of running in both directions then it is no longer a question for the purchaser but it is almost always open to him to choose either a reversing propeller or reverse gear.

In certain districts, and for certain purposes for instance, in parts of Scotland in fishing boats, reversing propellers are extensively employed, and one does not hear of them being replaced by reverse gears.

The fact that in Norway, where, perhaps, there are more fishing boats in service than in any other country, the reversing propeller is almost universal, shows that good results can be obtained by its employment on a large scale, and that there is nothing inherent in the propeller itself to render its application generally inadvisable.

The types of reversing propeller employed in the fishing boats of Scandinavia cost very much less than the reversing gears, and it is somewhat difficult to arrive at the real reason for the comparatively high cost of the propeller in this country. Presumably one of the causes is the fact that the number made is small, while the comparatively small attention that is devoted to the reversing propeller doubtless is a contributory reason to its relative non-adoption among commercial marine users in this country. The feeling is general, too, that reversing propellers can never be so efficient as the solid type, that in the neutral position one can never be certain that the boat will remain stationary, and that slackness generally develops after a period of use in some part of the propeller or its operating gear, which causes a still further loss of efficiency. In other words, what is urged against the reversing propeller is that its construction has not yet been developed in such a satisfactory manner as it should be, and it is, therefore, not looked upon with the same favor as a reversing gear, which itself, however, admittedly is open to improvement.

In the September issue of Motorship the reverse propeller used by the U. S. "Poseidon" (a vessel 185 ft. in length and of 835 tons D. W. capacity), was described and illustrated together with mechanism of thrust-block for operating same. This propeller of three blades is 8 ft. in dia. by 9 ft. pitch, with 16 sq. ft. blade area. This is only one of several which have been in use since the year 1909 in Europe, and have been chosen by certain engine manufacturers in preference to reversible engines.—Editor.

SHOULD MOTORSHIPS HAVE STACKS?

Considerable diversity of opinions exists among shipowners, builders and naval-architects as to whether or not it is desirable for motorships to be fitted with smoke-stacks, or funnels, as some prefer to call them. While the matter is not of vital importance it is well worth quite a little attention. It is hardly a matter that must be guided by the requirements of the installation, because with all the Diesel ships owned by the East Asiatic company, and by the North Star company, the funnel has been dispensed with and the hollow steel mainmast has been utilized for carrying the exhaust gases into the atmosphere, whereas the Anglo-Saxon Petroleum company have stacks fitted to all of the dozen motorships in their fleet.

Many people maintain that the absence of a stack improves the appearance of the ship, with which opinion we are inclined to agree, although everybody is so thoroughly accustomed to such an ugly structure that its absence makes one conscious that something important is lacking, and that the missing object gives the impression that the ship is incomplete. It would not take long, however, to accustom ourselves to the absence of a stack.

The main issue is that the modern motorship is a distinctive vessel and requires a prominent feature that will distinguish it from steamers even to the layman, and thus obtain for itself the proper publicity that it deserves. On this score we unhesitatingly vote for "funnelless motorships."

Motorships with funnels come into harbor and cruise away, and are passed on the high-sea unrecognized as motorships, the smoke from the donkey-boiler making them no different from an outward aspect to steamers. Hence it is no wonder that they are entered into the daily and weekly maritime records as steam vessels.

T. O. L.

The American Grocer of New York, a journal which for the past half century has maintained a preeminent position in the field of wholesale and retail merchandising, confers on Pacific Fisherman the following high editorial compliment:

THE PACIFIC FISHERMAN is always a captivating issue, typographically a beauty. It is well illustrated, its advertising pages attractive and its news of Pacific Coast fishery interests unequalled. It is joy to linger over its pages

Pacific Fisherman is a journal devoted solely to the commercial fisheries of the Pacific Coast—an industry producing annually from the sea a revenue in excess of fifty million dollars. Every Pacific Coast fisheries concern is an extensive operator of motor-propelled vessels. Among these people the circulation of Pacific Fisherman is absolutely complete, and affording to manufacturers of marine engines and supplies an unequalled opportunity for exploitation of the most practical character.

1321 Smith Bldg., Seattle, Wash.

LLOYD'S REQUIREMENTS.

A subscriber writes: In description of Skandia engine you speak of the crank shaft as "built to Lloyd's requirements." Will you please explain what this means?

Answer: All the parts during manufacture of engines intended to be placed in insured vessels undergo rigid examination and must come up to specifications as laid down by Lloyd's. These specifications are published in Lloyd's Register of Shipping, which is accessible through any of their branches.

DURKEE'S REPRESENTATIVE TOURS COAST.

J. M. Keely, whose home is in Tampa, and who handles Florida territory for C. D. Durkee & company, of New York, is now making an extended tour of the Pacific Coast, accompanied by his wife. It is possible Mr. Keely will be permanently assigned to this coast.

INGENIOUS JOB OF REPAIRING.

W. P. Murphy, engineer on the recently wrecked "Great Bear," is now in San Francisco, from where he writes the following interesting letter to Motorship:

"As for my plans for the future I intend to stay with the installation game for a while as it pays better than engineer.

"I thought you might be interested in a little experience I had the other day. I was asked to take a look at the 120-h. p. Bolinder in the Gracie S.

"I found the large casting on the after cylinder which supports the fuel pump assembly, broke clean across, port force feed oiler smashed, forward eccentric rod bent double and several minor breaks.

"Under the direction of D. W. & R. Z. Dickie I made an investigation and found the cause to be a closed out board discharge on the circulating line. It had been closed to effect some minor repairs to the piping, and the engineer had forgotten to reopen it.

"The circulating and bilge pumps are driven off the forward eccentric which also drives the fuel pump for the forward cylinder. In order to get at certain parts it was necessary to strip the whole after end of the engine. We rushed the broken parts ashore and into a waiting auto with orders to put the ship in commission at the earliest possible moment. We started in at 9 a. m. and at 11 p. m. had the engine ready for sea, which is some speed record considering the damage that was done. Being that a good many Bolinders are being adopted on the Pacific Coast, the methods used might be interesting.

"The large casting that supports the fuel pump was placed in a ten ton press. The parts carefully lined up and the pressure gradually applied till the parts were in their original places. We then made four dogs, or double-pointed trams to fit center punch marks laid out on all four sides of the casting above and below the break. It was then taken out of the press and reassembled on the welding table, clamped and lined up with the trams for welding.

"When the job was finished we had the surprise of our young lives, the casting was not out enough to notice. We had fully expected to have considerable machine work on it. Of course, a big part of it was due to the excellent material used in the engine castings. The oiler was clamped and wired with other parts and came out in good shape. It must be understood that in this case the fuel pumps do not have to vary more than 1-64 to make a big difference in the running of the engine. "Gracie S" went to sea the next day and her engine has been running satisfactorily ever since.

HANLON'S OAKLAND SHIPYARD.

D. J. Hanlon's new drydock on the East Oakland side of the estuary has been extremely busy for the last six weeks overhauling the Alaska Packing association vessels, which had the right-of-way at this plant and were put through in record time; and new work was also held up as a result of a shortage of lumber following the dock strike in August and September. Now that the rush of overhauling is out of the way, and lumber is coming in more freely, construction is proceeding in good shape on the ship started several months ago for the Western Fuel company, which has sold her to Norwegian interests, at a reported price of $210,000. This vessel has been fitted with a shaft-log, but so far the owners have made no definite arrangements to put an engine in her. She will be completed as soon as possible, and the Western Fuel company, which needs a vessel for coal traffic along the coast, has taken an option on the next ship to be built at Hanlon's. Details as to her construction are still uncertain, but it is understood that she will be a power schooner of about 3,500 tons.

The schooner, "Hugh Hogan," being remodeled for trading operations along the Mexican and Central American coast, on which work was held up a couple of months ago, has again been hauled out at Hanlon's plant and is being equipped with twin 160 h. p. Bolinder engines, while further carpenter work is being done inside the vessel.

TECHNICAL ARTICLES WANTED.

Motorship is in the market for contributions from authoritative sources dealing with the designing and operation of internal combustion engines and commercial motor-driven vessels of all types. Photographs, designs, etc., are also invited. All contributions accepted will be paid for.

PROFITABLE AUXILIARIES.

As an instance of the value of oil-engined auxiliary sailing vessels we note that such a vessel building in Holland for October-November delivery has sold for 160,000 guilders ($64,000 approximately), although of but 500 tons d. w. c. Her engine is a Kromhout of 140 b. h. p. and she is 131 ft. long by 26 ft. 11 in. beam and 11 ft. 6 in. draught. Light residual oil will be used as fuel.

ANOTHER LARGE MOTOR-TANKER LAUNCHED.

In the September issue of Motorship there appeared full details of "The Brammel Point." She is a sister motorship to the "Ralph M. Bullowa," which since has been launched. Both are of a fleet of vessels designed by Cox & Stevens of New York, for the Transatlantic Motor Ship company of Christinia, but recently sold to the Vacuum Oil company of New York.

These vessels are built with Isherwood framing, and are 300 ft. long overall, with 47 ft. beam and 28 ft. moulded depth. Their oil cargo tanks, thirteen in number per ship, have a total capacity of 5,000 tons; while the designed speed when loaded is 10 knots, the load draught being 22 ft. 8 in. In each ship three 550 b. h. p. Bolinder surface-ignition type heavy oil engines are being installed. Several new features are incorporated in these particular engines, and full details were exclusively given in Motorship for September.

A 3,000 H. P. MOTOR GUNBOAT.

We note a statement to the effect that the old Italian gunboat "Montebello" was equipped in 1914 with oil engines of 3,000 h. p., which gave her a speed of 18 knots. In which event the motors would most probably have been the F. I. A. T.-Diesel. This vessel is 220 ft. long and is of 814 tons, so is larger and higher powered than the Russian motor gunboats. She now is used as a mine layer.

CYCLONE WRECKS MOTOR AND STEAM SHIPS.

The terrific cyclone which swept over St. Thomas in the Danish West Indies was responsible for wrecking the Danish motorship "Anholt," also a number of steamers, including the Hamburg-America company's "Calabria" and "Wasgenwald." The SS. "Calabria" is expected to be a total loss.

This calls to mind that the East Asiatic company, which has in service, or building, twenty motorships each exceeding 6,000 tons d. w. c., has extensive property at St. Thomas. With the exception of a few small steamers that it uses in connection with its coaling station at this island, its entire fleet is Diesel engine-propelled, to which may be attached considerable significance.

PROBABLE MOTORSHIP SCHEME OF THE ALLIES.

The Inland-Water-Transport-Section of the Royal Engineers (Great Britain), 34 Victoria Street, London, S. W., is advertising for 500 motor engineers and 500 marine steam engineers of between the ages of 19 and 56 years for service at home and abroad. Evidently the Allies have in mind some great motorship or motorbarge transportation enterprise. Time will show what this is.

WOODHOUSE GETS AVANCE AGENCY.

Geo. H. Woodhouse & Co., of Seattle, have entered into an arrangement with J. S. Johnson, of Prince Rupert, by which they jointly handle the Avance engine on the Pacific Coast. Mr. Johnson expects to bring down from Prince Rupert to Seattle for demonstration purposes the tug powered with an Avance engine, and which has been in successful operation in northern waters for the past two years.

REMINGTON GETTING READY FOR BIG BUSINESS.

The Remington Oil Engine company is now in shape to take orders for early delivery of their oil engines, according to the announcement of A. D. Stroud, Seattle manager of the General Engineering & Sales Co., who handle Pacific Coast territory. Mr. Stroud says they are now arranging for local agents at all points along the coast.